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HYDROTHERAPEUTICS.[1]

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The use of water in the treatment of disease has received a fresh impetus in this country in recent years largely through the efforts of Dr. Simon Baruch, and hydrotherapeutic apparatus has been and is still being installed in many private sanatoria and in public hospitals for nervous and mental diseases. Whether it is a fashion, a fad which in time will disappear, remains to be seen. It must be remembered, however, that hydrotherapy has been used much more extensively in continental Europe than in this country and that the use of heat and cold, in some form or other, in the treatment of disease, is as old as the practice of medicine. The permanence of the present movement will depend, partly on its value as demonstrated by many careful observers, but perhaps quite as much on the accuracy with which it is prescribed by those who attempt to use it. Each one must acquire for himself a knowledge of the proper use of this agency without which he employs it in a routine way, without a proper selection of the patients or adaptation to the individual of the procedure employed.

This report is a record of the experience of the McLean Hospital where hydrotherapy has been actively, though more or less empirically, used since the spring of '99.

For a few months, previous to the installation of a regular apparatus in the bathrooms of the gymnasium for women in June,

[1] Read at the annual meeting of the American Medico-Psychological Association at St. Louis, May 30 to June 3, 1904.

'99, such methods were employed as are adapted to the bedroom or the ordinary bathroom, viz., cold ablutions; the dry pack (taking the place of the hot air bath) followed by the half bath, cold affusions, or the dripping sheet; and cold packs. In all cases the temperature of the water at first was 85° and was gradually reduced day by day to 60° F. By the use of these one can obtain much of the beneficial effect of hydrotherapy without complicated and expensive apparatus. Since installation of the apparatus the following baths have been given in addition to those above mentioned with these limits of temperature, duration and pressure:

Hot air bath, 180°-190°, 3-10 minutes.

Circular douche, 100°-90°, ½ to 1 minute, 15 to 38 lbs.

Fan douche, 85°-56°, 10 to 30 seconds, 15 to 38 lbs.

Jet douche, 75°-56°, 10 to 30 seconds, 15 to 30 lbs.

Scotch douche (either fan or jet) 110° alternating with 60°, ½ to 3 minutes, 15 to 30 lbs.

An attempt has been made to select from these, or to make combinations of, what would be most beneficial for the individual patient. The effect desired has been tonic or stimulating and careful attention has been paid to obtaining a good reaction, that is, a comparatively permanent return of the blood to the surface vessels. The dry pack or hot air bath is used first in any combination, dilating the surface vessels. The immediately subsequent application of cool or cold water causes them to contract, and there is a diminished blood supply in the skin. The impact of the water delivered under pressure tends to aid its return by reflex stimulation of the heart. There is no doubt that cold applications to a large part of the surface of the body at once increases the amount of blood in the internal organs. If the heart is strong enough immediately to return this blood to the surface, there has been a healthful flushing of these organs and theoretically an increased activity. If a reaction is not established, a dangerous congestion may result. The problem is to adapt the temperature, time and pressure to the strength of the individual that the reaction may be as perfect as possible. People differ in regard to their ability to respond and there is also a variation in the same person at different times according to his condition, so that even healthy people should use caution in taking these baths when they are tired. Cases of chronic tire require the most careful super-

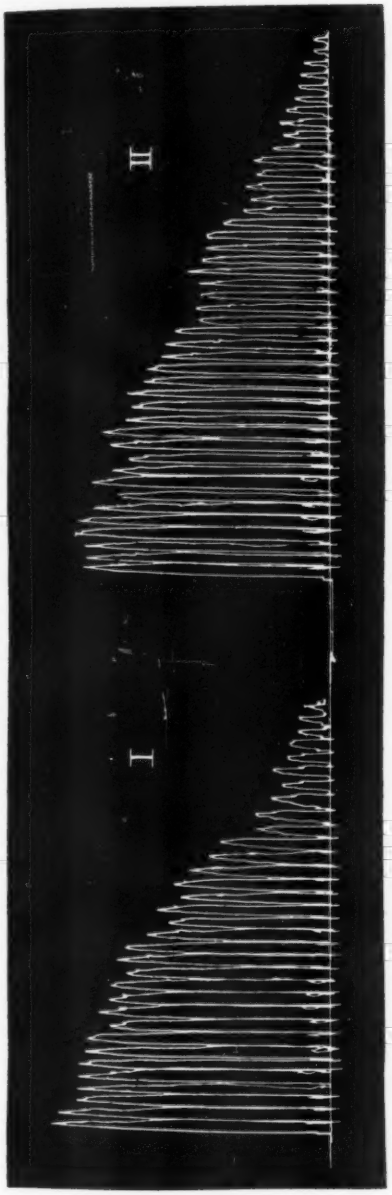
vision in order to avoid doing them harm. Those who are physically strong usually experience a sense of vigor and well-being after the most active measures, which feeling may last throughout the day, or in some be followed by drowsiness in an hour or two. The neurasthenic, if the bath is too vigorous, complains of being tired or completely exhausted, and will often lie down for an hour or two, the testimony being something like this: "They use me all up," "I was all tired out," "I could scarcely get back to my room," etc. Effort was made at first to obviate this feeling of exhaustion by giving the baths less frequently, perhaps three times a week, but it has been found better to raise the temperature, lower the pressure, and above all to shorten the time, continuing the baths daily. Considerable weight should be given to the testimony of patients with regard to their feelings after the baths, and if they complain of exhaustion, milder measures should be prescribed. The almost universal testimony of neurasthenics seems to conflict with the claim that these baths increase the capacity for work. Baruch says that cold applications increase, and warm decrease it. This statement is based upon the ergograph experiments of Vinaj and Maggiori in '92 and '93, who give fatigue curves showing a wonderful increase of work done after a cold plunge at 50° for 15 seconds, a gradually cooled bath at 96° to 68° for five minutes, a wet pack of two hours followed by a cold dip, a rain douche (50°), and a Scotch douche (98° and 50°),—following all these there is a great increase in working capacity; after the second it is increased threefold. Vinaj and Maggiori show also by experiments that cold applications restore the working capacity after fatigue. It is claimed that warm applications also have the effect of increasing the capacity for work, and of restoring it after fatigue, if they are combined with some mechanical irritation, like friction or the impact of water delivered under pressure, which counteracts the enervating effects of the temperature. The statement then is that only the uncomplicated, simple, warm applications reduce the capacity for work while all the others increase it, the cold, by virtue of their temperature, the warm, to a less degree in spite of their temperature, the effect of which is overcome by mechanical irritation.

In order to ascertain whether baths as given at the McLean

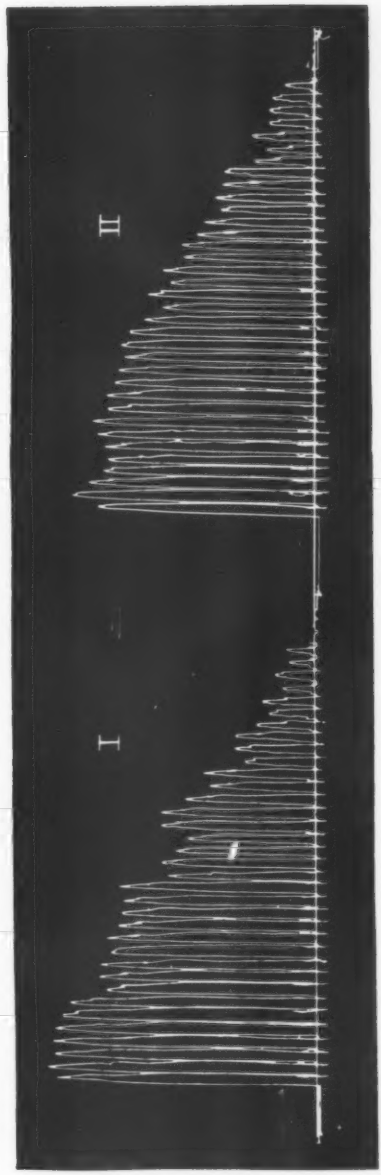
Hospital really increase the capacity for work, four series of experiments have been made on three patients and a nurse, all physically strong men. Each pulled on the ergograph to exhaustion twice with an interval of fifteen minutes, then went to the gymnasium for a bath, returned immediately to the laboratory and again pulled to exhaustion twice, with the same interval of time. For purposes of control the same men repeated the experiment on another day in the same way without the bath. As shown by the third and fourth curves there was a slight loss of capacity for work in three cases after the bath and an increase in the fourth; on the days when no bath was given there was sometimes a gain, sometimes a loss. If the results show anything they indicate a lessened capacity after the bath. Certainly they do not show the great increases above mentioned, although the baths given were not essentially different from those of Vinaj and Maggiori.

Observations were made on the variations in pulse rate, respiration and temperature during the various stages of an ordinary bath, which show that they all vary directly with the temperature to which the individual is subjected, with the exception that lowering of the pulse rate by cold applications is somewhat delayed by the mechanical irritation of the impact of the water in the douche, and also that the sudden application of cold douches causes considerable irregularity in the rhythm and depth of respirations, but they both finally drop under the influence of a lowered temperature, and they drop much more rapidly than they were raised by heat. The fall in pulse rate is sometimes very sudden,—in one case, in 70 seconds there was a change in the rate of 60 beats; in another 66 in the same time; in a third, 72 in 40 seconds. The duration of the hot air bath was from 6 to 10 minutes; the patient began to perspire in from 2 to 9 minutes; the pulse rate increased to 120 or 130 during the hot air bath, and dropped in some cases to 60 or lower in from 40 seconds to 1⅓ minutes. The respirations during the hot air bath increased from 5 to 14 a minute, and immediately returned to the normal point after the douches. The temperature taken in the mouth was raised from 2° to 1.2° by a hot air bath (180°-190°) of from 7 to 15 minutes' duration, the rise varying in different persons and in the same person on different days. It was found to be

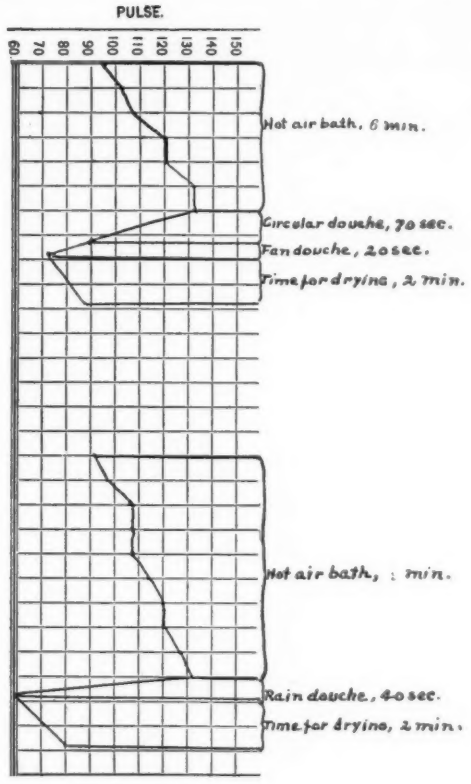
FATIGUE CURVES OF CASE II.

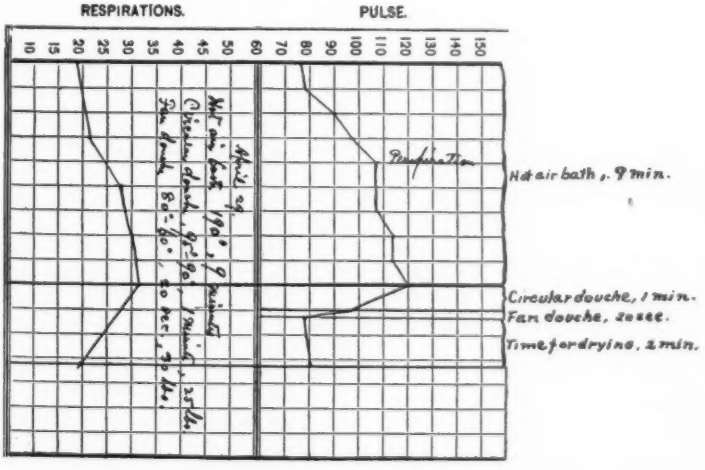


BEFORE THE BATH.



AFTER THE BATH.


PULSE.
60
70
80
90
100
110
120
130
140
150
Hot air bath, 6 min.
Circular douche, 70 sec.
Fan douche, 20 sec.
Time for drying, 2 min.
Hot air bath, 5 min.
Rain douche, 40 sec.
Time for drying, 2 min.


RESPIRATIONS.
PULSE.
10
15
20
25
30
35
40
45
50
60
70
80
90
100
110
120
130
140
150
Hot air bath, 9 min.
Circular douche, 1 min.
Fan douche, 20 sec.
Time for drying, 2 min.

ERGOGRAPH EXPERIMENTS.—EFFECT OF BATHS ON CAPACITY FOR WORK.

Case.	1902.	Pull Number.		Total Height.		Pull Number.		Total Height.		Gain or Loss.	Gain or Loss.	
		1st Trial.	2nd Trial.	1st Trial.	2nd Trial.	3rd Trial.	4th Trial.	3rd Trial.	4th Trial.			
I	March 18	56	55	1135	1239	42	44	943	1069	−25	−362	A bath was given between the 2nd and 3rd trials on March 18 and 19.
	" 19	43	47	959	1229	44	39	990	868	− 7	−330	
	" 22	61	44	1531	1197	57	47	1311	1109	− 1	−308	Bath:—Hot air, 190°, 9 minutes (perspiration); Scotch douche, 106° alternating with 60° for 1 minute, 30 lbs. pressure; fan douche, 60°, 15 sec., 30 lbs.
	" 24	49	39	1193	985	47	45	1158	1122	+ 4	+102	
	" 29	51	58	1275	1473	66	63	1506	1310	+20	+ 68	
	April 10	60	55	1458	1530	58	57	1439	1406	=	−143	
II	March 20	47	44	1052	1127	37	35	1033	956	−19	−190	Bath as for case I, between 2nd and 3rd trials on March 20, 22 and 25.
	" 22	33	44	1066	1246	35	35	1097	1035	− 7	−180	
	" 25	35	35	1055	1054	37	35	1050	928	+ 2	−131	
	" 24	35	39	1114	1163	35	40	1005	1112	+ 1	−160	
	" 28	36	33	1054	948	38	35	1082	1046	+ 4	+126	
	April 7	36	38	1126	1112	41	42	1083	1183	+ 9	+ 28	
	" 8	44	43	1356	1334	45	46	1336	1268	+ 4	− 86	
	" 9	41	43	1147	1160	45	41	1223	1098	+ 2	+ 14	
	" 10	38	42	1185	1244	44	43	1256	1200	+ 7	+ 27	
III	April 23	43	43	1745	1752	43	42	1588	1569	− 1	−340	Bath between 2nd and 3rd trials on Apr. 23 and 24.
	" 24	42	42	1716	1631	45	43	1637	1477	+ 4	−233	
	" 21	44	45	1833	1820	44	38	1804	1590	− 7	−259	Bath:—Hot air, 190°, 5 minutes; circular douche, 97° to 90°, 1 min., 28 lbs.; jet douche, 70°, 15 sec., 28 lbs.; fan douche, 60°, 15 sec., 28 lbs.
	" 22	42	43	1878	1891	43	44	1816	1744	+ 2	−207	
IV	" 23	51	48	1576	1629	56	58	1754	1864	+15	+413	Bath as for Case III, between 2nd and 3rd trials on April 23 and 24.
	" 24	44	48	1564	1681	59	51	1935	1721	+18	+411	
	" 21	46	43	1687	1593	51	52	1671	1765	+14	+165	
	" 22	46	50	1649	1836	44	52	1546	1736	=	−203	

lowered somewhat immediately after an application of cool or cold water, but its fall was not so rapid as in the case of pulse rate and respiration.

There is a change in the blood pressure under the influence of hot and cold applications which is rapid and of short duration. It varies inversely with the temperature. Hot applications lower it, cold applications raise it. I have used at different times the instruments of Fitz, Gärtner and Riva Rocci. Precautions were taken to eliminate so far as possible other causes of variation such as the time of day, position, exercise, fatigue, and emotional disturbances. All the observations were made on women,—patients and nurses.

Notwithstanding considerable variation in the results, there is no doubt that the pressure falls while the patient is in the hot air bath and quickly rises to the normal again during the subsequent application of cool douches. Below is given a table showing the blood pressure of different persons, or the same persons at different times, before the bath, while the patient is in the hot air cabinet and immediately after the cool douche. Each number, except the lowest, is the average of at least ten observations. This sudden, and, in some cases, material fall of the blood pressure is

BLOOD PRESSURE IN MM. HG.

Before the Bath.	While in Hot Air Cabinet.		After Douche.
	Average.	Lowest.	
125	117	110	120
123	115	103	122
107	108	103	115
118	113	106	114
114	105	98	114
118	113	112	111
115	106	97	118
116	105	94	116
110	100	95	112
133	118	110	129
118	112	105	125
132	117	106	134
125	100	91	124
125	112	103	124
126	103	93	126
149	127	122	142
138	132	125	143
134	116	108	133
132	120	110	130
126	121	114	134

no doubt the reason why some people faint in the hot air cabinet, and it should be used cautiously with weak neurasthenics and with elderly people, especially those who show an arterio-sclerosis.

Considerable importance has been attached by Dr. Baruch to the fact that certain procedures are followed by an increase in the number of red and white cells in the blood taken from the lobe of the ear. A hot air bath of 10 minutes followed by a jet douche of five seconds caused an increase of 700,000 red and 1500 white cells. A tub bath of 80° for ten minutes was followed by exactly the same increase. This we have been unable to confirm. Dr. Guy G. Fernald of the hospital staff has made many counts in a very careful way before and again at varying intervals after the baths, taking blood from the lobe of the ear, but without any uniformity of result. Sometimes there has been an increase, again a diminution of both red and white cells, sometimes an increase of one and a diminution of the other. There is no doubt that after a cold bath of from 10 to 15 minutes duration, while the individual is thoroughly chilled, the blood in the surface vessels will contain an increase of cells. This does not show a more active circulation of cells which have been driven out from their hiding places, so to speak (Winternitz). It seems more probable that it is merely a local affair, an irregular distribution of cells and plasma, due to a constriction of the surface capillaries under the influence of cold (Ewing). These capillaries are some of them so small that the cells can only go through singly under normal conditions, and when strongly contracted they may not permit their passage at all, the plasma then running on, leaving many cells stranded. Thus for the time being there is a larger proportion of cells in the blood of the skin. Instead then of causing a more active circulation of cells, the effect is just the opposite in the surface vessels and it is a disadvantage,—a serious one if long continued. All observers agree that it is a temporary affair which disappears within 15 or 20 minutes, or as soon as a reaction is established. Warm baths cause a contrary effect.

I present a few careful observations showing the number of red and white cells before the bath, at the end of the hot air bath, 2 minutes after the douche, and 1½-2½ hours after the bath, with a description of the bath in each case.

Considerable work has been done by various observers to de-

EFFECT OF BATHS ON THE NUMBER OF RED AND WHITE BLOOD CELLS.

Case.	Time.	Before the Bath.			End of Hot Air Bath.			2 Minutes after Douches.			1½ to 2½ hs. after Bath.			Bath.
		Red.	White.	Ratio.	Red.	White.	Ratio.	Red.	White.	Ratio.	Red.	White.	Ratio.	
I	10 A. M.	4,914,500	9,184	654				4,676,600	7,630	613				Hot Air, 172°, 3 m.; circular, 95°-90°, 50 sec., 32 lbs.; fan, 75°-60°, 30 sec., 32 lbs.
II	" "	5,253,000	6,360	826				4,817,000	7,440	648				Hot Air, 186°, 8 m.; circular, 95°-90°, 45 sec., 30 lbs.; fan, 85°-65°, 25 sec., 30 lbs.; jet, 65°, 10 sec., 25 lbs.
III	" "	4,720,000	9,211	512				4,779,000	8,911	536				Hot Air, 190°, 16 m.; circular, 95°-90°, 1 m., 32 lbs.; fan, 65°, 30 sec., 32 lbs.; jet, 65°, 5 sec., 25 lbs.
III	" "	4,785,665	10,600	451	5,047,242	8,584	588	4,555,410	8,972	500	4,658,841	7,875	592	Hot Air, 188°, 10 m.; circular, 95°-90°, 1 m. 35 lbs.; fan, 70°, 30 sec., 30 lbs.; jet, 70°, 15 sec., 25 lbs.
III	" "	4,881,841	8,666	563	4,648,907	9,892	470	4,673,905	10,444	447	4,539,937	10,346	440	Hot Air, 190°, 11 m.; circular, 95°-90°, 1 m., 35 lbs.; fan, 70°-60°, 30 sec., 35 lbs.; jet, 60°, 15 sec. 25 lbs.
IV	" "	4,375,000	5,995	730	4,322,000	5,477	790	4,189,000	5,694	736				Hot Air, 188°, 14 m.; circular, 95°-90°, 35 sec., 28 lbs.; fan, 85°-68°, 25 sec., 28 lbs.
V	" "	4,810,000	7,385	665	4,639,000	9,020	514	4,463,000	9,295	480	4,697,000	8,121	570	Hot Air, 186°, 17 m.; circular, 95°-90°, 30 sec., 30 lbs.; fan, 70°, 30 sec., 30 lbs.; jet, 70°, 5 sec., 25 lbs.
V	" "	4,674,693	7,300	640	4,406,165	6,268	703	4,172,722	7,138	584	4,123,793	7,249	568	Hot Air, 180°, 12 m.; circular, 95°-90°, 30 sec. 35 lbs.; fan, 65°, 30 sec., 35 lbs.; jet, 65°, 5 sec., 25 lbs.
VI	" "	4,713,661	9,102	511	5,067,165	8,584	581	4,987,254	7,638	651	4,995,523	7,462	671	Hot Air, 180°, 8 m.; circular, 95°-90°, 45 sec. 30 lbs.; fan, 70°-60°, 25 sec., 30 lbs.
VII	" "	5,600,114	5,968	938	5,100,741	5,368	950	5,455,961	6,182	880	5,594,170	8,666	645	Hot Air, 188°, 12 m.; circular, 95°-90°, 40 sec., 32 lbs.; fan, 80°-65°, 30 sec., 30 lbs.; jet, 65°, 5 sec., 25 lbs.
VII	" "	5,328,630	7,058	754	5,069,035	6,867	740	5,029,385	7,583	676	4,883,824	8,121	601	Hot Air, 187°, 8 m.; circular, 95°-90°, 45 sec., 32 lbs.; fan, 70°-65°, 30 sec., 32 lbs.; jet, 65°, 15 sec., 25 lbs.

termine the effect of hot and cold baths on tissue changes of the body. While there is some difference in results, most published reports show an increase of both constructive [?] and destructive metabolism. (The Principals and Practice of Hydrotherapy by Simon Baruch, M. D.: Digest of Metabolism Experiments, by Atwater and Langworthy, 1898.) In none of these experiments was a uniform or fixed diet given. The total amount of nitrogen excreted is a measure of the metabolism of the body only when the nitrogen of the food is taken into consideration.

Observations have been made by Dr. Otto Folin, in the laboratory of the McLean Hospital, to determine whether such baths as we are giving cause any change in metabolism. Nine persons were given a uniform diet adapted to the capacity of the individual, containing a known amount of nitrogen. After this diet had been continued for two days the urine was collected for each twenty-four hours and analyzed with the results shown in the following tables. After three or four days, baths were given for about the same period of time. The results are practically negative.

While these experiments seem to show that there is no increase of metabolism from such hydriatic procedures as we employed, they do not show that if the patient were free of the restriction of a fixed diet he would not eat more, gain in weight, and eliminate more nitrogen during the bath period. Our records show that of 216 consecutive cases who were given similar baths, 168 gained in weight and 48 lost. The gain was from ¾ to 33¾ and the loss from ½ to 22½ lbs. It has been noticed that the gain is usually preceded by an initial loss of a pound or two during the first week of the baths.

Cold packs have been given at temperatures between 85° and 60° with a duration of from ½ to 2 hours. If often changed, they reduce the temperature of the body; if long continued, they raise it. They have been found exceedingly useful in cases of maniacal excitement for their soothing and even hypnotic effect.

While my observations thus far do not sustain some of the claims made for hydrotherapy, there are sufficient reasons for its use. Not the least of these is the fact that it can be adapted to the physical condition of any patient. It seems to act on the circulation, respiration, blood pressure and temperature, without active muscular exertion on the part of the patient. There probably is

EFFECT OF BATHS ON METABOLISM AS SHOWN BY ANALYSIS OF THE URINE.

	1902.	CC. in 24°.	Sp. Gr. 1, 0—	Total N_2 gms.	Total P_2O_5 gms.	Total SO_3 gms.	Ratios. 100 N_2 : P_2O_5	Ratios. 100 N_2 : SO_3	Ratios. 100 SO_3 : P_2O_5	Gain or Loss in Weight, gms.	Days of Bath.	Remarks.
Man, 36 years.	Mch. 13	1300	20.	16.2	3.35	2.97	20.7	18.3	113.		No bath	Daily diet:—Eggs (with shells) 535 gm.; breast of chicken, 30 gm.; bread, 200 gm.; butter, 75 gm.; sugar, 80 gm.; salt, 5 gm.; apple, 150 gm.; milk, 800 cc.; water, 1000 cc.
	" 14	990	24.5	15.4	3.02	3.10	19.6	20.1	97.4		" "	
	" 15	1100	20.	14.5	2.86	2.68	19.7	18.5	106.7		" "	
	" 16	1080	21.5	15.7	3.13	3.01	19.9	19.2	104.		" "	
Totals.		4470		61.8	12.36	11.76				+220		
	" 17	1670	18.	17.8	3.37	3.39	19.	19.	99.4		Bath	Total water in food and drink about 2300 cc.
	" 18	975	24.	15.6	3.41	3.15	21.8	20.2	108.2		"	
	" 19	1275	20.5	16.2	3.16	2.90	19.5	17.9	109.		"	Total N_2 about 17.2 gm. Total fuel value in calories about 2850.
	" 20	1180	20.	15.5	3.18	3.02	20.5	19.5	105.		"	
		5100		65.1	13.12	12.46				−220		
	" 21	1365	20.5	16.8	3.34	2.75	19.9	16.1	122.		No bath	
	" 22	940	23.5	15.3	2.77	2.90	18.1	19.	95.5		" "	
	" 23	1020	23.5	14.9	3.11	2.81	20.9	19.	112.		" "	
	" 24	1420	19.	16.7	3.62	3.11	21.7	19.	116.4		" "	
		4745		63.7	12.84	11.57				+150		
	" 25	1200	25.	16.9	3.74	3.41	22.1	20.2	109.7		Bath	Bath:—Hot Air, 190°, to perspiration; Scotch douche, 105° alternating with 60°, 1 minute, 80 lbs. pressure; fan douche, 55°, 15 sec., 80 lbs.
	" 26	950	23.	14.6	3.04	2.83	20.8	19.4	107.4		"	
	" 28	930	27.	15.3	3.25	2.97	21.2	19.4	109.4		"	
	" 29	1035	26.	15.6	2.92	2.96	18.7	19.	98.6		"	
		4115		62.4	12.95	12.17				+150		
Woman, 26 years.	Mch. 20	1600	19.	12.76						−142	Bath	Daily Diet:—Tomato soup, 300 cc.; steak, 80 gm.; breast of chicken, 60 gm.; roast lamb, 50 gm.; potato, 250 gm.; bread, 150 gm.; butter, 75 gm.; jelly, 75 gm.; sugar, 20 gm; salt, 5 gm.; 1 orange; 1 baked apple; milk, 800 cc.; water, 1000 cc.
	" 21	1820	13.5	13.10							"	
	" 22	1390	17.	12.23	2.19	1.86	17.9	15.2	118.	−369	"	
		4820		38.09								
	" 23	1030	18.	11.75	1.88	1.87	16.	15.9	100.9	+397	No bath	
	" 24	980	24.	13.90	2.16	2.09	15.5	15.05	103.	+425	" "	
	" 25	1390	16.	13.28	2.09	1.98	15.7	14.9	105.5	−113	" "	
		3400		38.93	6.13	5.94						

EFFECT OF BATHS ON METABOLISM AS SHOWN BY ANALYSIS OF THE URINE.—*Continued.*

	1902.	CC. in 24°.	Sp. Gr. 1, 0—	Total N_2 gms.	Total P_2O_5 gms.	Total S O_3 gms.	Ratios. 100 N_2 : P_2O_5	Ratios. 100 N_2 : S O_3	Ratios. 100 SO_3 : P_2O_5	Gain or loss in Weight, gms.	Days of Bath.	Remarks.
	Mch. 26	1240	17.5	11.42	1.98	1.78	17.3	15.6	111.1	+ 57	No Bath	Total water in food and drink, about 2800 cc.; total N_2, about 14 gm.; total fuel value in calories, about 2250.
	" 27	1500	16.	12.75	2.13	1.95	16.7	15.3	109.2	−142	" "	
	" 28	1425	16.	12.40	1.95	1.87	15.7	15.1	104.1	+142	" "	
		4165		36.57	6.06	5.60						
	" 29	1340	17.	12.61	1.98	1.89	15.7	15.	104.8	+284	Bath	Bath :—Hot air, 174°, 5 m.; circular, 95°, 20 sec., 26 lbs.; fan, 85°-75°, 25 sec., 26 lbs.; jet, 65°, 5 sec., 20 lbs.
	" 30	1640	19.	12.25	2.21	1.85	18.	15.1	119.9	− 85	"	
	" 31	1000	30.	11.73	2.16	1.76	18.4	15.	122.4		"	
		3980		36.59	6.35	5.50						
Man, 40 years.	April. 15	2125	20.5	20.11	3.76	3.387	18.7	16.8	110.9		No bath	Daily diet :—Tomato soup, 350 cc.; steak, 100 gm.; breast of chicken, 75 gm.; boiled ham, 50 gm.; potato, 400 gm.; bread, 175 gm.; eggs, 140 gm.; butter, 75 gm.; corn starch, 200 gm.; 1 apple; 2 bananas; milk, 900 cc.; water, 1125 cc.
	" 16	1650	21.5	18.66	3.73	3.08	20.	16.5	121.		" "	
	" 17	2060	19.5	19.99	3.70	3.17	18.	15.8	117.		" "	
		5835		58.76	11.19	9.637						
	" 18	1450	23.	19.53	3.62	3.21	18.5	16.4	112.9		Bath	
	" 19	1860	19.	19.9	3.81	2.97	19.1	14.9	128.4		"	
	" 20	1640	22.	20.79	3.69	3.42	17.7	16.4	108.	+907	"	
		4950		60.22	11.12	9.60						Total water in food and drink about 3300 cc.; total N_2, about 19 gm.; total fuel value in calories, about 2808. Bath :—Hot air, 190°, to perspiration; circular, 98°-90°, 1 m., 30 lbs.; jet, 70°, 20 sec., 30 lbs.; fan, 60°, 25 sec., 30 lbs.
Man, 27 years.	Dec. 13	1250	28.	19.7	4.77	3.87	24.2	19.6	123.4		No bath	Daily diet :—2 kilos* liquid food with 900 cc. water extra.
	" 14	1330	24.	19.96	4.92	3.83	24.7	19.2	128.5		" "	
	" 15	1380	22.	18.51	4.05	3.50	23.8	18.9	129.1		" "	
	" 16	1100	27.	17.98							" "	
		5060		76.15								

*Liquid food :—500 cc. whole milk; 300 cc. Cream (18-22 % fat); 450 gm. Eggs (white and yolk); 20 gm. Sugar; 200 gm. Horlick's Malted Milk; 6 gm. Salt (75 cc., of a 10 % vol.); water enough to make 2 liters. This contains about 19 gm. N_2, 5.75 gm. P_2O_5 and 3.70 gms. S O_3.

EFFECT OF BATHS ON METABOLISM AS SHOWN BY ANALYSIS OF THE URINE.—*Continued.*

	1902.	CC. in 24°.	Sp. Gr. 1, 0—	Total N_2 gms.	Total P_2O_5 gms.	Total SO_3 gms.	Ratios. 100 N_2 : P_2O_5	Ratios. 100 N_2 : SO_3	Ratios. 100 SO_3: P_2O_5	Gain or loss in Weight, gms.	Days of Bath.	Remarks.
	Dec. 17	1350	24.	18.26	4.59	3.56	25.1	19.4	129.		Bath	Bath:—Hot air, 190°, 5 minutes; circular, 98°–90°, 45 sec., 25 lbs.; fan, 65°, 15 sec., 25 lbs.; jet, 75°, 10 sec., 25 lbs.
	" 18	1325	25.	17.88	4.57	3.43	25.5	19.2	133.		"	
	" 19	1050	29.	18.02	4.14	3.58	22.9	19.8	116.		"	
	" 20	1040	27.	17.	4.12	3.18	24.2	18.7	129.		"	
		4765		71.16								
Man, 37 years.	1903.											
	Jan. 9	1700	16.	15.18	3.06	2.97	20.2	19.6	103.3	− 40	No bath	Daily diet:— 2 kilos liquid food with 900 cc. water extra.
	" 10	890	30.	14.8	3.42	3.11	23.1	20.1	110.	−100	" "	
	" 11	1405	19.	15.5	3.79	2.98	24.5	18.9	137.	−180	" "	
		3995		45.48	10.27	9.06					" "	
											" "	
	" 12	1135	25.	15.6	3.74	3.24	24.	20.8	115.	−140	" "	
	" 13	1425	19.	15.6	3.79	3.12	24.3	20.	121.4	+160	" "	
	" 14	1110	24.	16.4	3.46	3.29	21.1	20.	105.	+400	" "	
		3670		47.6	10.99	9.65						
	" 15	1400	20.	16.13	3.86	3.23	23.9	20.	119.	−300	Bath	Bath:—Circular, 97°-90°, 1 m., 30 lbs.; fan, 60°, 15 sec., 30 lbs.; jet 70° 15 sec., 30 lbs.
	" 16	1450	23.	16.61	3.86	3.11	23.2	18.7	124.	−100	"	
	" 17	1660	17.	16.92	3.75	3.39	22.2	20.	110.6	+200	"	
		4510		49.66	11.47	9.73						
	" 18	935	26.	15.42	3.74	3.18	24.2	20.6	118.	+200	No bath	
	" 19	1570	19.	16.48	3.71	3.11	22.5	18.8	119.	− 40	" "	
	" 20	1125	22.	14.87	3.95	3.07	26.5	20.6	128.7	+240	" "	
		3630		46.77	11.40	9.36						
Man, 28 years.	Jan. 26	1025	24.	14.81	3.38	2.81	22.2	19.	117.		No bath	Daily diet:—2 kilos liquid food with 900 cc. water extra.
	" 27	1545	16.	14.22	3.43	2.72	24.1	19.1	126.		" "	
		2570		29.03	6.81	5.53					" "	
	" 28	1600	16.	16.22	4.16	3.17	25.6	19.5	131.	+730	" "	
	" 29	1275	23.	16.88	3.64	3.24	21.6	19.2	112.	−225		
		2875		33.10	7.80	6.41						
	" 30	1100	25.	16.54	3.74	2.93	22.6	17.7	127.	+450	Bath	Bath:—Hot air, 190°, 5 m.; circular, 98°–90°, 45 sec., 25 lbs.; fan, 70°, 15 sec., 25 lbs.; jet, 80°, 10 sec., 25 lbs.
	" 31	1450	18.	15.83	3.83	3.10	24.2	19.6	124.		"	
		2550		32.37	7.57	6.03						

EFFECT OF BATHS ON METABOLISM AS SHOWN BY ANALYSIS OF THE URINE.—*Continued.*

	1903.	CC. in 24°.	Sp. Gr. 1, 0—	Total N_2 grms.	Total P_2O_5 grms.	Total SO_3 grms.	Ratios. 100 N_2 : P_2O_5	Ratios. 100 N_2 : SO_3	Ratios. 100 SO_3 : P_2O_5	Gain or loss in Weight, grms.	Days of Bath.	Remarks.
Man, 57 years.	Jan. 27	1550	20.	16.76	3.94	3.13	23.4	18.7	126.	− 60	No bath	Daily diet:—2 kilos liquid food with 900 cc. water extra.
	" 28	1325	19.	15.98	3.71	3.12	23.2	19.5	119.	+280	" "	
	" 29	1475	19.	15.93	3.83	3.12	24.1	19.6	122.7		" "	
		4350		48.67	11.48	9.37						
	" 30	1580	20.	16.49	3.89	3.08	23.5	18.7	126.	−170	Bath	Bath:—Circular, 98°-90°, 45 sec., 20 lbs.; fan, 70°, 15 sec., 20 lbs.; jet 85°, 10 sec., 20 lbs.
	" 31	1480	20.5	16.68	3.91	3.18	23.5	19.	123.	−170	"	
	Feb. 1	1375	20.	15.82	3.69	3.20	23.3	20.2	115.	+ 60	"	
		4435		48.99	11.49	9.46						
Woman, 41 years.	" 7	1625	14.	10.42	2.54	2.08	24.4	20.	122.		No bath	Daily diet:—1333 gms. liquid food with 900 cc. water extra.
	" 8	920	24.5	10.15	2.39	2.07	23.5	20.4	115.		" "	
	" 9	1650	14.	10.42	2.26	2.03	21.7	19.5	111.		" "	
		4195		30.99	7.19	6.18						
	" 10	1250	16.	10.05	2.06	2.25	20.5	22.4	91.6		Bath	Bath:—Hot air, 190°, 5 m.; circular, 90°, 20 sec., 18 lbs.; fan, 85°-80°, 20 sec., 30 lbs.
	" 11	1215	18.	10.92	2.43	2.15	22.2	19.7	113.		"	
	" 12	920	19.5	9.92	2.30	2.08	23.2	21.	110.		"	
		3385		30.89	6.79	6.48						
Man, 60 years.	" 18	1075	18.	16.3	3.95	3.22	24.2	19.8	122.	+200	No bath	Daily diet:—2 kilos liquid food with 900 cc. water extra.
	" 19	1500	20.	14.07	3.60	2.85	25.6	20.2	126.	−400	" "	
	" 20	1610	18.	14.11	3.86	2.77	27.3	19.6	140.	+300	" "	
		5085		44.48	11.41	8.84						
	" 21	1525	18.5	13.87	3.81	2.80	27.6	20.3	136.	+100	" "	
	" 22	1625	18.5	16.41	4.14	3.08	25.2	19.	134.	+600	" "	
	" 23	1325	24.	15.68	4.04	2.89	25.9	18.4	140.	+400	" "	
		4475		45.96	11 99	8.77						
	" 24	1890	19.	16.75	4.16	3.34	24.9	20.	125.	+200	Bath	Bath:—Hot air, 190°, 4 m.; circular, 98°-90°, 45 sec., 20 lbs.; fan, 85°-75°, 20 sec., 20 lbs.
	" 25	1975	17.	14.48	3.79	2.93	26.2	20.2	129.	−400	"	
	" 26	1825	18.5	15.70	4.07	3.16	26.	20.1	128.	+160	"	
		5690		46.93	12.02	9.43						

also a more permanent secondary effect on the blood-vessels as is shown by a quicker and more perfect reaction with continued use of the baths.

Theoretically there should be an effect on the internal organs in the way of increase of activity from periodical flushing. This may be so, though the metabolism experiments reported by me do not show it.

The effect of these baths on the mind of the patient should not be overlooked. He has not the slightest doubt that something is being done for him. No one ever told me that the baths had no effect, while complaints of their severity have not been uncommon. Patients always speak of them respectfully. A former patient with the delusion of demoniacal possession, who had improved while taking baths, wrote me " Your baths are excellent to reduce cerebral excitement. You can't fight the devil with fire,—he is in his element there,—but he is mortally afraid of cold water."

It is something for the melancholy patient to go to the gymnasium daily for a bath and gentle exercise, with the idea thus kept prominent that he is sick and that efforts are being made for his recovery. Far better is the morning spent in this way than in sitting about the ward, lamenting his terrible condition or brooding over imaginary woes.

We have given baths to all forms of mental diseases; many who have taken them have recovered, but they were all of the forms of diseases generally recognized as recoverable.

FEIGNED INSANITY: MALINGERY REVEALED BY THE USE OF ETHER.[1]

By CHARLES G. WAGNER, M. D.

Superintendent of the Binghamton State Hospital, Binghamton, N. Y.

On the morning of the 14th of January 1902, William H. Ennis, 32 years of age, a police officer in the Borough of Brooklyn, city of New York, killed his wife, Mary A. Ennis, by shooting her with a revolver. He then went to a small hotel in the neighborhood, engaged a room, went to bed and was soon asleep. An hour or two later he was arrested and lodged in jail. He was indicted by the Grand Jury for murder in the first degree, was tried in the May following, convicted of the crime as charged and sentenced to death during the week beginning July 7, 1902. His case was appealed but the sentence was affirmed and December 14, 1903 was finally designated as the date of execution.

During the trial it was shown that Ennis had been a police officer for eight or nine years; that he was a hard drinker and possessed a bad temper; that he was married in November 1900 and had boarded with his wife's mother for about four years prior to his marriage; that after his marriage he frequently came home intoxicated and was abusive in language and conduct toward his wife who finally left him about four months before the commission of the crime with her three weeks old baby, and obtained a legal separation. A large amount of expert medical testimony was offered by the defense in the attempt to show that the accused was suffering from paranoia; that he was delusional, epileptic and demented, and that he was unable to walk on account of lateral spinal sclerosis, all of which conditions were declared absolutely incurable. Other testimony by well-known experts was offered

[1] Read at the annual meeting of the American Medico-Psychological Association at St. Louis, May 30 to June 3, 1904.

by the prosecution to show that the accused was feigning. In court Ennis was incoherent and answered questions irrelevantly or not at all. He appeared unable to walk without assistance or to stand erect with his feet squarely on the floor. When he attempted to walk, at each step as he rested his weight to some extent on the ball of his foot, a violent coarse tremor agitated the entire leg. These abnormal mental and physical phenomena Ennis exhibited throughout his trial, and, after conviction, on the way to the state prison at Sing Sing, N. Y., where he was confined until his execution.

From the testimony of the prison physician at Sing Sing, the warden of the prison and the keepers who came in daily contact with Ennis, it appears that throughout the whole eighteen months during which he was confined in the prison, he manifested little if any interest in his surroundings or in outside matters; rarely asked questions and when spoken to usually replied incoherently or not at all. His expression and manner impressed the prison officials as indicating dementia or imbecility, although they were somewhat suspicious that he might be feigning. During the entire period of his incarceration Ennis was never observed standing or walking without assistance; at all times he appeared to be unable to sustain his weight with his feet squarely on the floor, but when supported on each side he could walk or drag himself along on the balls of his feet, and while doing so his legs were invariably violently agitated by the coarse tremor previously referred to. As the time for execution approached the warden of the prison being in doubt as to Ennis' mental condition, requested the Governor to appoint a commission to examine him. Governor Odell appointed as such commission Dr. George A. Smith, medical superintendent of the Manhattan State Hospital at Central Islip, N. Y., Dr. Daniel H. Arthur, medical superintendent of the Gowanda State Hospital at Gowanda, N. Y., and the writer. On the 1st of December 1903, the commission met at the prison and after careful study of the records of the case examined Ennis. The prisoner was brought from his cell by two keepers to the office of principal keeper Connaughton. As he entered the office he was in great agitation. His legs, and to a less degree both arms, trembled violently. He appeared unable to walk, but apparently tried to put his feet forward step by step as the officers

supported him into the room. Apparently when he bore but little weight on the balls of his feet the muscular tremor of his legs became so great that he would have fallen if he had not been supported. He appeared unable to straighten his legs so as to bring his heels to the floor. When seated in a chair the tremor subsided and his mental agitation became less pronounced. The expression of his countenance was idiotic or imbecile and he appeared not to know where he was or to realize the nature of the questions that were put to him. When asked his name he made no response until the question was repeated many times, and then only when spoken to sharply, he said, "Ennis." When asked his first name, after considerable delay he said, "William." After being asked many times how old he was, he said, "35" which was not correct, his age being 33. No further answers could be drawn from him during the examination, but when asked if he had ever received any injury to his head, he nodded quickly in the affirmative and pointed to a spot on his head where an old scar was visible. When asked why he trembled, he made no reply, but to the question, "Are you afraid?" he immediately laughed and shook his head as if desirous of conveying the idea that the tremor was due to disease and not to fear.

Ennis frequently laughed during the interview in an imbecile manner and almost continuously moved his lips as if whispering to himself, but no sound of speech could be heard. He continually looked about the room with a vacant stare. At the close of the examination, when removed from the office to his cell he dragged his feet in the same manner as when entering, and exhibited the same tremor of the legs and arms.

On the 3rd of December—two days later—Dr. Smith, Dr. Arthur, and the writer again visited the prison and saw Ennis. He was brought into the office by two keepers. His countenance wore the same imbecile expression and his gait was unchanged, but when questioned he manifested slightly increased intelligence. He gave his name more promptly and when asked about the injury to his head, he immediately raised his hand to the vicinity of the scar and said "Doctors did that." When asked where he was, he replied, "In a hospital," and said that Doctors brought him there. He did not seem to realize that he was in prison, that he had committed a homicide, or that he had ever had a wife. His

hearing was tested and found good. His pupils reacted promptly to light and distance. Reflexes were normal except the knee-jerk which was slightly increased. When shown different colored worsteds, he called red black and yellow red, but a few moments later when shown yellow again he appeared unable to say what color it was. When tested as to taste he answered promptly and correctly when given sugar, but shook his head when asked to tell what salt, acetic acid, and bromide solutions tasted like. A variety of other tests were made and although Ennis showed somewhat more intelligence than on our first visit, he would not admit any knowledge of his crime. The examination lasted nearly two hours, after which Ennis was returned to his cell, two keepers supported him on his way to the elevator, and the same tremor of his legs was observed as when he was brought in. At this time the prison physician stated that after our first examination while visiting Ennis in his cell he had asked him why he did not answer our questions, to which he replied that he did not know who we were and so he was not going to talk to us.

The results of our examination had thus far been to a considerable extent negative and, therefore, unsatisfactory. But owing to the contradictory character of the testimony at the trial and the irregularity of the alleged symptoms during his imprisonment, the commission were all of the opinion that Ennis was malingering, notwithstanding the absence of conclusive proof to sustain their convictions. It then occurred to the writer that an anaesthetic might be of use in obtaining the desired evidence—the idea being that if Ennis were malingering the fact would become patent when all voluntary and purposeful action should be in abeyance; accordingly, the commission met at the prison on December 8th for the third time. The prisoner was again examined. His expression of countenance, manner, gait and general appearance were unchanged. He was taken to the hospital operating room, placed upon the table and ether was administered. He made no resistance and although his breathing was observed to be shallow he was soon apparently quite unconscious, but when taken from the table and with the assistance of two keepers made to walk he quickly revived and exhibited the same phenomena of gait, and the same expression of countenance as at the previous examinations.

In a few minutes he was again placed upon the table and ether

administered until his muscular system appeared relaxed and consciousness was again apparently gone, but on being brought to his feet, although it was evident his mental faculties were somewhat clouded, his gait and countenance were unchanged. After a short delay Ennis was placed on the table for the third time. He made considerable resistance and declared he would not "take any more of that stuff," referring to the ether. Resistance was overcome and the ether administered until complete unconsciousness and thorough muscular relaxation were obtained. Just before this degree of anaesthetization was reached Ennis became talkative, profane, and abusive; his voice was loud and strong, and his language coherent, forcible and expressive; whereas previously he had talked but little and always in a low tone. While still profoundly unconscious he was lifted from the table and stood upon his feet. As consciousness began to return, with a little assistance he walked across the room without difficulty or muscular tremor, and at each step placed his foot squarely upon the floor. He walked out into the corridor to the elevator and on reaching the ground floor walked to his cell without assistance. The plea of lateral spinal sclerosis was thus disposed of.

The change in the character of Ennis' speech during anaesthetization, his coherent, loud, profane language which was evidently a near approach to his normal expression, and the elimination of the alleged spinal disease satisfied the commission that the pretense of insanity was without foundation and report was made to the Governor accordingly.

On the day following the last examination Ennis was visited by the prison physician, but he would not talk beyond saying that he was sick and wanted to sleep. The next morning, however, he was very communicative. When he saw the prison physician approaching he immediately called out "I had all you fellows guessing all right and you never would have caught me only for the ether." He said he had been "under an awful strain for a year and a half" and that he would "rather go to the chair than go through the same experience again." He talked freely about the murder and put the blame for the crime on his wife's mother. He talked intelligently about his whole life, admitted the crime and had no hope of escaping the electric chair. He said that no physician or lawyer had posted him on how to act or walk, but

that one day while standing at his cell door, before his trial and after the alcohol was pretty well eliminated from his system, his legs trembled so much that he could not stand and keep them quiet. This trembling suggested the idea, and all that he had to do, he said, was to exaggerate the shake somewhat and put on a " few fine touches."

The prison physician stated in a letter to the writer after the execution that Ennis proved to be quite a sensible fellow in his conversation, and that he went to the chair without showing any fear; in fact, that he was as brave a man as he had ever seen under similar conditions.

RECONCILIATION OF THE DISPARITY BETWEEN HOSPITAL AND ASYLUM TRAINED NURSES.[1]

By C. P. BANCROFT, M. D.

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The word *asylum* in the caption is used merely to designate the distinction between a hospital for the treatment of general diseases and a hospital for the care of mental diseases. At the present time any affection of the mind is considered a disease and any institution that undertakes the care and study of mental disease in all its manifold relations psychical, physiological and pathological, a hospital.

A paper dealing with the training of nurses cannot claim novelty, at most it must be a re-presentation of a subject always of interest to the practical psychiatrist. The chief secret of successful care of the insane lies in the securing of proper nurses. The importance of this desideratum in any hospital is the writer's apology for saying anything on a subject so thoroughly exploited.

No one will interpose objections to the training of nurses in institutions for the insane. No alienist who has had experience would ever revert to the old method of having untrained attendants upon the insane any more than the general hospital superintendent would wish to manage his hospital with the old fashioned nurse who was physician's helper, nurse if she possessed the temperamental qualifications and ward maid combined. Estimable as were many of these women, faithful and devoted to their work as they may have been, still the modern trained nurse in the general hospital is so vastly superior by reason of her intelligence as to compel conviction.

In hospitals for the insane, while the same sort of conviction exists, still there is an admitted difference, a sort of tacit feeling that

[1] Read at the meeting of the American Medico-Psychological Association at St. Louis, May 30 to June 3, 1904.

the two kinds of nurses do not stand on quite the same solid foundation. The public as well as the nurses themselves often have the feeling that the asylum nurse does not possess quite the same qualifications as her sister nurse trained in the general hospital. How are we to make the training and experiences of the two classes of nurses more nearly equivalent? Are we to try to do it all? Or is it better to admit that both classes should remain specialized, each confining themselves to their own individual work?

Two factors underlie the establishment of training schools for nurses:

First, the better care of the patient, and secondly the utilitarian purpose on the part of the hospital to secure efficient nursing at a moderate price. In the general hospital the nurse serves her course of two or three years and then is expected to leave and enter upon the practice of her profession outside the hospital, unless perchance she may be one of the limited number selected for a special position of trust in it. In the hospital for the insane there is a little uncertainty as to the future of the graduate nurse owing to differences in methods of training and in conception of the purpose and scope of the asylum training school by the managers of these institutions.

In the early days of asylum training schools many thought that instruction should be limited to the nursing of mental disease, and that strict specialization should be the dominant principal. By this means it was hoped that greater permanency might be secured among asylum nurses. When, after a few years, it was found that these trained nurses did not average as long an institution residence as did many of their untrained predecessors, criticism was not infrequently heard that the whole scheme of asylum training schools was a failure. These unbelievers said that the old attendant who was faithful and who remained in the institution many years was more desirable than the trained nurse who as soon as her course was completed became anxious to leave the service and try her hand in new work outside the institution. In their minds training had only served to make the nurse restless and more ambitious. The hospital after two years hard work lost its pupil just at the very time when it was hoped that she might become most efficient. This criticism, however, is specious and not based on the right principle. The easiest way is not always

the most desirable. The results that are secured without hard work and with little friction are not always the most satisfactory or enduring. It must be taken for granted that young women with the brightest minds and the greatest aptitude for mental nursing will naturally seek new fields for their ambition after their training is finished. A few may remain in positions of trust in the service, but it must be expected that the majority will, by very reason of the mental impetus initiated by their training, seek larger fields in which to test their capacities. But this frequent changing of nurses, aside from the additional work imposed upon the hospital staff, is not to my mind particularly objectionable. The infusion of new blood into the service, the successes of those who have preceded, the ever constant stimulus of good example tend to develop an esprit de corps which more than compensates for the shortness of the service.

Admitting then the fact that changes must occur yearly as classes graduate, that training in the hospital for the insane does not mean any greater permanency of individual service than corresponding training in the general hospital, the questions arise, shall we specialize our instruction in the hospital for the insane? Shall we maintain the separation between the two classes of nurses? Or shall we endeavor to draw them nearer together making the standard and experiences of the one more nearly equivalent to the other so that a trained nurse whether graduated from general hospital or asylum training school will stand on similar ground not only in her own estimation, but in that of the community as well?

It must be admitted that in securing nurses for training, the hospital for the insane is handicapped. Few young women in seeking a nurse's education would on first thought select an asylum in preference to a general hospital. First the character of the disease does not appeal to the ordinary individual, and secondly the demand for mental nurses in the general community is not sufficiently great to secure constant employment. In order that young women of intelligence and in sufficient number may be secured it is necessary for the asylum to provide something more than special instruction in mental nursing. The institution must enlarge its training so that the graduate nurse will feel competent to undertake the profession of general nursing. Is this broader instruction

to be attained by affiliation with some general hospital, the nurses exchanging places with one another so that the experiences and instruction of both will be equivalent? If this method is not practicable how can the disparity between the two classes of nurses be reconciled?

If an exact interchange of nurses could be made between some general hospital and an asylum, much might be said in favor of such affiliation. Unfortunately this interchange is not very practicable. The majority of nurses do not feel that they can afford the time necessary for courses of instruction in two hospitals. Very rarely are general hospitals and asylums located in such proximity and with such close relationship as to render an interchange of nurses feasible. Finally, experience has shown that, while asylum graduate nurses are frequently willing to enter general hospitals and do excellent work in these institutions, rarely does it occur that graduates from general hospital training schools are desirous of entering asylums. Those who would make this change for purely academic reasons are very few in number.

In a way, too, the training and practice in a general hospital unfits a nurse for the special work in the hospital for the insane. The nurse in a general hospital, accustomed to rely on the patient's mental integrity and personal responsibility, merely follows the routine directions prescribed by the visiting physician and the rules of the hospital. The nurse in an asylum is constantly being taught that the patient's judgment and responsibility are impaired and that her own judgment must ever be tactfully substituted for that of the patient. Tact and self-control become cardinal virtues in the asylum nurse. The almost constant exercise of judgment, tact and self-control develop a patient forebearance that is of inestimable value in the care of the sick. The graduate nurse from the general hospital finds all the requirements so changed upon entering the asylum that adjustment to the new conditions becomes extremely difficult. Most general hospital nurses, undertaking special training in an asylum, become impatient, see nothing to do and grow weary under the constant demands made upon their nervous energy.

Close affiliation with a general hospital being impracticable, what course is desirable for the asylum training school? Personally the writer believes that the best results can be attained by the

adoption of a comprehensive course of training that will fit graduates for general as well as special nursing outside the hospital. It may as well be admitted that graduates will not remain long in the asylum. Nearly all will desire to practice their profession outside the institution and ought not to be discouraged in their ambition. Of these a few will from time to time be glad to return as head nurses and become all the more valuable by reason of their larger experience in private nursing. The moral effect upon the community of these asylum graduate nurses is excellent. Their services do much to lessen the old popular superstitions concerning insanity, and remove the prejudices against asylums. The public through their presence come to realize that insanity is a disease, that the asylum is a hospital, and that nurses are as essential there as in the general hospital or for the care of any other illness.

That the course of instruction in the asylum training school may be made the equivalent of that of the general hospital, every facility for clinical drill must be utilized. This is to be accomplished in various ways. One of the most important agencies for this purpose is the hospital building not only for the acute psychoses, but for the hospital nursing of those patients who are sick in bed. Too often does it happen that the sick in bed in asylums are scattered throughout the entire institution. Such cases, as far as is possible, should be brought together in the hospital building. This building should be constructed on the lines of the general hospital but with sufficient elasticity to admit of some individualization in the treatment of mental conditions. There should be a common ward for those entirely cared for in bed, single rooms for patients requiring isolation, these wards and rooms being provided with every appliance that experience has demonstrated desirable in the nursing of patients in the general hospital. The " hospital idea " so long insisted on by Dr. Cowles should be the dominating feature of this building. It is most desirable that all new cases, particularly the acute psychoses, should be admitted into the hospital building, receive their first examination there, and the subsequent clinical study so essential in the recent case. The important first impression on the patient is a favorable one. Whatever his own morbid ideas may be the *hospital* rather than the *asylum* impression is the striking feature in his new environment. Of almost equal emphasis is the same impression upon the nurse. The more she

becomes imbued with the hospital spirit the more useful will she be to the institution and the better equipped for the general practice of her profession. The hospital building should also be provided with wards for the physically sick and infirm demented patient. No cases require more skillful nursing than these and none better tests the capabilities of a good nurse. Many of the Scotch asylums have hospital buildings constructed and managed on the same lines as the general hospital with what seemed to the writer most desirable results.

Furthermore, this hospital building should be at a little distance from the main group though connected by corridor or subway. The impression of detachment will be secured while transfers to and from the main buildings can be made under cover. Connected with the building should be a surgical operating room equipped with every modern appliance. In a large hospital for the insane occur many surgical cases. Without a suitable operating room many cases requiring surgical measures are either treated in a temporizing way, or are sent elsewhere. All such work should be done in the hospital so that the nurses will derive experience in the preparation of the room and patient as well as in the management of dressings and instruments. Modern asepsis should be taught here and there is no good reason why the nurses should not receive as good drill in this subject as those in a general hospital. The occasion for abdominal surgery not infrequently arises in hospitals for the insane and should always be improved. Specialists are always available outside the institution and can readily be secured for assistance when necessary, provided the asylum possesses the requisite building and equipment. The surgical operating room should be central to the wards of the hospital building and should be adjacent to a large passenger elevator so that patients from the wards can easily be brought to the room. Every case requiring surgical measures either in the way of operation or dressing should be brought here where absolute asepsis can be taught and practised. Too often these steps are neglected because of lack of suitable place and appliances. With the proper equipment the medical staff are given healthy stimulus and the nurses taught correct technique.

The hospital building should have wards for both sexes conveniently separated by such administrative apartments as are

necessary. A most important feature is the management of this entire building, which should be vested in a head nurse of experience, preferably a graduate of the hospital with a subsequent experience in a general hospital or general nursing outside the hospital. This should not be a divided management, partly male and female. The hospital building should be absolutely under the care of the head nurse and her assistants. The nurses should feel that they are in control. Division of responsibility between male and female attendants is not productive of good results but leads rather to friction and irritation.

The care of the male patients and male wards in the hospital building should devolve on women nurses as far as is possible, with such assistance from orderlies as is necessary, the methods being similar to those prevalent in general hospitals. It is the writer's conviction from his own somewhat limited personal experience and from his observations where the experiment has been tried that male insane patients sick with physical or surgical infirmity receive better care from women nurses than from male attendants, that male patients with few exceptions appreciate such care, and that with proper supervision no objectable unpleasantness to the nurse arises. Finally, rotation of service should prevail in every institution for the insane as in general hospitals. Every nurse should serve on both day and night duty in the hospital building as well as in the wards of the institution. Too long service in any one ward wearies the active nurse and intensifies the ennui in the unambitious nurse. The nurse who is not willing or is not able to serve in any and every ward is not imbued with the proper spirit and ought not to be entitled to graduation. The reactionary effect upon the nurse of rotation of service is excellent. Especially valuable is the nursing of both male and female patients in the hospital building. Service in these wards should be the goal to which each junior nurse should look forward.

These desultory remarks by no means cover all that might be said upon the subject of a hospital building. They are merely intended to emphasize the necessity for such a department, to demonstrate its relation to the nursing service of the institution. As an educational aid to the nurse, as a most important agent in lessening the disparity between asylum and general hospital trained nurses, I believe the hospital building is a *sine qua non* in any institution for the insane undertaking the training of its nurses.

In addition to the hospital building there are other agencies that increase the efficiency of the asylum trained nurse, the most important of which are drill in the keeping of clinical notes, practical diet kitchen service, dispensary work, the preparation of surgical dressings, the administration of baths and massage, and especially insistence on a high standard not only in the passing of examinations but in efficient work at the bedside and in the management of patients. In these especial agencies every asylum possesses specific means for furnishing a drill and mental discipline equivalent to that of the general hospital. One of the most desirable qualifications of a trained nurse is the power of quick clear observation, one of her most important requirements is the ability to concisely report what transpires in the sick room. Nowhere in the whole field of medicine is better opportunity afforded for exercise of the powers of observation than in the wards of a hospital for the insane. A patient does not talk, has all sorts of vagaries, refuses food; it remains for the nurse to ascertain what is going on in this patient's mind, and in a few brief clinical notes to state not only what the nurse has done but what the patient's thoughts and conduct have disclosed.

It is needless to say that diet kitchen service can be made just as effective in the asylum as in the general hospital. That this may be done, a well equipped diet kitchen with adjacent supply room should be provided. A teacher resident in the hospital or periodically engaged from some metropolitan cooking school should give regular courses of instruction in sick room cookery. Each nurse should serve so many weeks in the diet kitchen executing orders for sick diets given by the physician. In this way the diet kitchen is not only of practical value to the nurse but profitable to the hospital.

Dispensary drill can be made equally efficient. Each nurse serves a stated time in the drug room familiarizing herself with weights, measures, pouring of drugs and such compounding as is required of a nurse. Similarly in the preparation of surgical dressings, in the making of the various aseptic solutions, care of instruments, preparation of the operating room and table the asylum nurse should be given such thorough drill in the hospital building that all these duties will become a second nature to her so that she will

perform them with the same facility and precision as the soldier executes his manual of arms.

In the administration of the various kinds of baths and massage the asylum offers especial advantages. Hydrotherapeusis and massage are of great value in many cases of mental disease and should form an important feature in the nurses' training. The facilities for these measures should be fully equivalent to those offered in the general hospitals.

The maintenance of a high standard for graduation is especially important. Efficient work in the wards, facility in the management of insane patients should be regarded as essential for graduation as mere intellectual proficiency. Nurses not possessing the requisite tact, judgment and self-control should be eliminated from the service before the senior year is reached. The moral value to the nurse of these qualifications is so great that I believe that any young woman proficient in the care of the insane is quite sure of success in the practice of general nursing. Experience has demonstrated that the majority of asylum nurses after graduation have been commended for the possession of these very virtues that are the outgrowth of the mental discipline incident to successful care of the insane. There is good reason, therefore, why young women not possessing the mental traits essential to good asylum service should be eliminated. Those that remain prove doubly valuable, doing credit to themselves and the hospital that graduates them.

The hospital for the insane located in or near a large city possesses peculiar advantages over one more remotely situated. It is possible for the asylum near a city of some size to establish relationship with some dispensary, or better still, a district nursing association. Most large and many small cities maintain district nursing associations which not only are a most worthy charity but furnish valuable material for practical nursing. As ordinarily managed these associations undertake nursing in the homes of the poor, furnishing a nurse for a few hours each day in such families as could not afford a nurse the entire time. The service is quite varied, including confinement cases, non-contagious fevers, surgical dressings, many emergency cases and the care of the sick room. Not even a general hospital offers a better drill than a well appointed district nursing service. The personal adaptation of the nurse to varying conditions in the homes of the poor, the manage-

ment of the patient and the sick room with meagre resources at command is a far better test for the nurse than the well equipped hospital.

The official connection of the New Hampshire State Hospital with a local district nursing association has proved such a benefit to the training school of the institution that brief mention of the fact seems pertinent. In 1900 a district nursing association was organized in the city of Concord. A graduate nurse from the Waltham Training School was engaged to inaugurate the work. In a few months owing to increased service it became necessary for the organization to engage an assistant nurse. Recognizing the abundance and value of the clinical material available the New Hampshire State Hospital entered into business relations with the association to furnish pupil nurses. At a later period upon the resignation of the head nurse the position was filled by a former graduate of the State Hospital whose training had been supplemented by a post graduate course in a New York city general hospital. The district nursing service soon proved such a worthy charity that a second pupil nurse became a necessity. At the present time two senior undergraduate nurses are rendering eight weeks service in the city under the direction of a former graduate of the hospital. From personal experience I can testify to the excellent variety and character of the work and the admirable discipline and training afforded the nurses. District nursing supplies exactly the kind of experience a nurse needs. It supplements the asylum practice, giving the nurse a practical training in obstetrics, fever and surgical work. This house to house nursing provides the same sort of experience for the nurse that dispensary district practice furnishes the young physician. It is of even greater value than ward nursing in a general hospital because of the ever varying environment and the test imposed upon the personal resources of the nurse. The quality of the service rendered by each nurse is a determining factor in her graduation. A nurse cannot receive her diploma whose district work is not satisfactory. Her work must pass the inspection and approval of (*a*), the numerous physicians whose cases are treated, (*b*), the Board of Visitors of the association who frequently visit the different houses making personal inspection and receiving comments from the various families and (*c*), the head

nurse who assigns the cases and has immediate control of the instruction and the work. The inspection is, therefore, sufficiently thorough to put each nurse upon her mettle, to insure efficiency and prevent slackness or neglect. The results have been so gratifying that I do not hesitate to recommend district nursing wherever practicable as a most valuable adjunct to the curriculum of the asylum training school. This service is a stimulus to the nurse and is a most potent factor in lessening the disparity between the general hospital and the asylum trained nurse.

Every asylum should have a Nurses' Home entirely detached from the main building. Such provision is in line with what general hospitals are doing for their nurses and tends to elevate the character of the service. The nurses are better prepared for their regular duties by the untrammelled recreation thus afforded them. A separate building suitably furnished and under the supervision of the head nurse dignifies the service and establishes a distinction between the nursing and the domestic departments. Absolute change is as essential for the special as for the general nurse. Asylums should follow general hospitals in the erection of nurses' homes. They are one of the agencies that lead to the securing of a more intelligent service.

The writer's purpose in presenting a paper on so familiar a topic will be fulfilled if discussion is awakened thereby, or the expression of new experiences is elicited from fellow-workers. Training schools for asylum nurses long ago passed the experimental stage. Greater intelligence in his nursing staff is the earnest desire of every asylum superintendent. The instruction afforded by the training school in so far as it induces young women of ability to apply for ward positions and develops those already in the service is fulfilling a most important mission. If by any means this training can be so broadened through the agencies enumerated as to make the asylum graduate feel that she is as well qualified for the general practice of her profession as the general hospital graduate, then the problem of securing desirable nurses in the hospital for the insane will be materially lessened.

A FEW REMARKS ABOUT OBSERVATION WARDS AND HOSPITALS.[1]

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In the last few years so much has been said and written about psychopathic and observation hospitals that I feel that an apology is due for presenting on this subject a paper which contains so little that is new or original. The attempt some three or four years ago to induce the Boston City Hospital, of which I was at that time a subordinate officer, to receive into its wards cases of doubtful insanity and of delirium tremens brought the matter rather forcibly to my attention. Dr. Baldwin's paper before this Society in 1901 on the subject of the proper provision for such cases was inspired by the same movement, of which he was an active promoter. Most communities of any considerable size have to face this problem. In this country a few cities, such as New York, Brooklyn, Philadelphia, Pittsburg, Albany, and perhaps some others have made special arrangements to solve it. Three of these, New York, Philadelphia and Albany, I visited. It occurred to me that a few observations on the principal features in the actual working-out of the problem might be of interest to others as well as myself.

The class to be provided for is much larger than the title of Dr. Baldwin's paper indicates. The increasing differentiation or specialization of organized relief for various kinds of dependents leaves still a miscellaneous residuum of cases not yet adequately provided for in most communities. These residuals, as I shall call them for the sake of brevity, include not only the cases of doubtful insanity and of delirium tremens referred to by Dr. Baldwin, but also such conditions as sudden outbreaks of violence or

[1] Read before the American Medico-Psychological Association at St. Louis, May 30 to June 3, 1904.

excitement, suddenly developing puerperal insanity, epileptic or alcoholic or other convulsions or seizures, attempted suicides, persons found dazed or irresponsible in the streets, and persons so deeply intoxicated as to need medical observation. In this class should also be included those cases of undoubted insanity which are waiting for the necessary forms of commitment to be made out, a process requiring from a few hours to a few days in some communities. Most of these cases, except the last class, require more or less prolonged observation before they can be sent to the appropriate place of relief or care. They represent emergencies of greater or less urgency. In New York nearly 76 per cent of the residuals are found to be insane, a little over 14 per cent are not insane, and 10 per cent are cases of delirium tremens. In Albany over 61 per cent are acutely delirious or insane, 12 per cent are not insane, and over 26 per cent are cases of intoxication or delirium tremens. The data for Philadelphia were not available at the time of my visit. In Boston, of the cases falling into this category over 64 per cent are insane or epileptic, nearly 15 per cent are not insane, and over 20 per cent are cases of delirium tremens.

It is obvious that all these cases need medical observation. Most of them need general or insane hospital care, and many need it at once, without the delay necessitated by formal commitment. The protection of the community or of the friends of the patient occasionally requires the instant restraint of a patient. In the interest of the 12 to 15 per cent of the not insane (and perhaps of the 10 to 20 per cent of the delirium tremens cases) this restraint should be possible without certification of insanity or the disgrace of arrest by the police. These conditions cannot be well secured in the police stations or jails, nor yet in workhouses or almshouses, where such cases are sometimes sent. Whether they can be found better in general hospitals or hospitals for the insane will appear from a consideration of what is now being done for the residuals in this country and abroad.

Under the reform administration in New York the new management of Bellevue Hospital reorganized the working of the Insane Pavilion. The building, a separate pavilion, is unchanged at present. It contains two wards, one for men and one for women. Each consists of a long, straight, wide hall which is also

a day room, with single rooms for patients on either side, and bath, toilet, dining and serving-rooms. There is a dormitory room containing 5 beds for the sickest bed-patients. There is no way of separating quiet and well-oriented patients from the noisy and disturbing ones except by secluding the latter in their rooms. Each room has a sliding door with a peep-hole, the windows are guarded, the walls smooth and with hard finish. The wards are kept locked. There is no airing court for out-of-door exercise. Patients were formerly under the care of the visiting and house staff, whose invariable order was " sedatives and restraint s. o. s." Under the new régime there are three resident salaried physicians, all of whom have been assistant physicians in hospitals for the insane, and four consulting alienists and neurologists; the medical and surgical visiting staff may also be called in consultation. Since this change was made about 85 per cent of the " sedative and restraint s. o. s." orders have been found unnecessary. The men's ward is in the care of a woman supervisor who has had long insane hospital experience, and the orderlies are assigned to duty from the state insane hospitals for specified terms. The women's ward is in care of a head nurse and pupil nurses from the Bellevue Hospital Training School for Nurses—a concession to the training school. Patients are brought as emergencies by the police or by friends who claim that they are insane; or they are committed for 5 days on a charge of insanity by a magistrate upon application of friends; or committed by the superintendent of Out-Door Poor for 5 days for observation; or they may be transferred from the general wards of the hospitals. All intoxicated persons and cases of incipient delirium tremens applying are sent to the alcoholic ward of the hospital and not admitted at all to the Insane Pavilion—only well marked cases of delirium tremens are admitted, which accounts for the low relative percentage of such cases in New York as compared with the other cities. Patients stay very rarely as long as ten days, and only occasionally as long as a week; five days is the usual outside limit. If found on sufficient observation to be insane, they are committed to hospitals for the insane on certificate of two of the resident physicians; or they are discharged, or given in charge of their friends, or transferred on account of medical or surgical ailments to the appropriate wards

in the general hospital. Instruction to students is contemplated, but not yet begun.

The cases passing through this pavilion are numbered by thousands. Their stay is brief—three or four days. The pavilion is a mere distributing station from which the patients are sent to the appropriate place of relief as soon as that can be determined. During the time necessary for this determination they have good care under the direction of specialists in the kind of disease that afflicts the great majority of them. Among the plans for the new Bellevue it is contemplated to so change the construction of the pavilion as to allow the grouping of patients, in order that the quiet and inoffensive may not see the turbulent cases. If authority to hold the patient for observation against his will for five days without legal process were conferred on the department, thus making unnecessary the magistrate's commitment on a charge of insanity—a prejudgment that is not always confirmed—some injustice to patients might be avoided. For purposes of study and of clinical instruction it would be advisable that patients remain a longer time under observation—say not to exceed two months. This however would necessitate a considerable enlargement of the accommodations, and for economic and administrative reasons might not be feasible.

At Blockley Hospital in Philadelphia the municipal almshouse and the general and insane hospitals are grouped together under one general management. There is no separate pavilion for the residuals, but four wards, two for men and two for women, in the building of the general hospital department are used for reception or detention wards. One of each is for alcoholic and delirium tremens cases, the other for the residual class and all cases committed to the insane department. The building is old, not originally intended for this use, and in many respects not now well adapted to the needs of this class. They are dormitory wards, without separate rooms for individual patients. They are kept locked, and have guarded windows. These wards are under the medical supervision of the salaried resident physician in charge of the insane hospital department. There are two regularly appointed visiting alienists, whose function is indicated below, and the medical and surgical staff can be called in consultation. The nurses are those of the general hospital. The patients are brought

by friends or by the police as emergencies, or on certificate of insanity signed by two physicians not connected with the hospital. After admission those not already committed as insane are seen by the two visiting alienists and if insane are by them certified as such. Those patients who are likely to require hospital residence for a month or more are transferred to the insane hospital department. Others are kept in the Detention Ward for one, two or three weeks and discharged from there or sent to appropriate wards of the general hospital. At the time of my visit data were not available concerning the number or kind of cases passing through the Detention Ward. Except in regard to the structural deficiencies, which prevent a segregation of the quiet from the disturbed observation cases, the general plan of care works satisfactorily.

The semi-public Albany Hospital has a pavilion a little removed from those containing the wards for the general medical and surgical cases, but connected by corridors with the main group of buildings. This Pavilion F has now been in operation for two years. It contains two locked wards of 17 beds each, all but four of which are in single rooms, the four being in a small dormitory room. There are three sitting rooms, and the whole ward is capable of being subdivided into smaller sections which allow segregation into small groups of three or four patients. Some rooms have guarded windows, plain smooth interior finish and sound-proof walls. Quiet and well oriented patients need not see noisy and turbulent ones. There is no closed court-yard for out-of-door exercise. The medical care of patients is under the close supervision of a visiting physician who has had several years' experience as assistant in hospitals for the insane. He visits the pavilion twice daily. A medical interne of the general hospital visits during his absence in case of need, and often with him. The medical and surgical staff of the hospital can be called in consultation. The nursing service is in charge of a supervisor who was trained in both insane hospital and general hospital training schools; the nurses are assigned from the hospital training school to service for a specified time in Pavilion F. There is but one orderly or male nurse in the pavilion. Almost no restraint or sedatives are used. Formerly the delirious patients in the general wards were given large doses of hyoscine and other

sedatives. Delirious patients from the general wards and any suitable patients, except such as may be brought by force or fraud, are admitted without commitment or other formality. This exception occasionally makes the pavilion fail to meet some of the most urgent needs of patients or their friends. No patient is kept who demands discharge except such as have been committed to a hospital for the insane and are waiting transfer. Patients are kept from a day or two to six months. Clinical instruction is given to students of the Albany Medical College.

This method of taking care of the residuals works admirably except in the case of such turbulent cases as require immediate hospital care but who are sufficiently oriented as to know their surroundings and refuse to go to or remain in the pavilion. The governors of the hospitals have refused to accept the authority to admit or hold a patient, even for a brief limited period of time, against his will, lest the hospital become liable at some time to suit for damages by some disgruntled patient, and to avoid the similarity to a hospital for the insane which such authority would imply. An appreciable number of patients have been declined for this reason. Only 331 patients have been admitted to Pavilion F, though Troy, Schenectady and other neighboring cities and towns have contributed as well as Albany itself. If the numbers should increase largely the system of having a visiting physician would probably prove inadequate and a salaried resident physician with insane hospital experience would become necessary. Since patients are kept for treatment it would be advantageous to have an out-door yard for the use of patients who might otherwise escape.

In Germany many municipalities have established what they call psychopathic wards, pavilions or hospitals, easily accessible from the more densely populated parts, admission to which is obtained with a minimum of formality. They are all constructed and organized as far as possible on the lines of a small hospital for all classes of the insane. Dr. Clark's concise and instructive paper before this society last year mentioned most of those in Germany and described especially the newest one at Kiel. We in America cannot afford to overlook this German movement when our municipalities are contemplating the proper care of their residuals.

It is clear from the foregoing descriptions that the nearer the

conditions approach those of the insane hospitals the more satisfactorily are the residuals cared for, and the better are their needs and those of their friends and the community supplied. If this be so, why are not the already established hospitals for the insane adequate and satisfactory?

The reasons are several. In the first place, many cases are emergencies occurring in the centres of population, while hospitals for the insane are remote, often requiring a journey of an hour or more by rail and a mile or more by carriage, with facilities ill adapted to the needs of an exhausted or excited patient. Then, admission is possible only on certificate of insanity or, in some states, also on the voluntary written request of the patient. Again, the time required to secure the legal form of commitment varies in different states from a few hours to a few days. Further, a considerable percentage of residuals (12 to 14 per cent.) prove to be not insane, yet many of them need observation to determine this fact who would not voluntarily commit themselves. It would therefore be necessary to put upon them the "stigma of insanity" as many regard it; it will be many years before public sentiment becomes so enlightened that it will not be so looked upon. And lastly, the average person shrinks from the words *asylum, insane, lunatic,* which enter into the names of almost all the hospitals for the insane. The sentiment may be unreasonable, but the fact remains that it is at present a potent factor in delaying the admission of patients to such hospitals, sometimes to the great detriment of the patient.

It may be asked why, especially in a large community, the wards of a general hospital are not adequate to meet the needs of this class. The reasons are many. The chief ones are briefly as follows:

1. General hospitals have not the authority to hold persons against their wills.

2. The wards of general hospitals are open, not locked, and a patient may easily escape. Also the nurses' attention and time are taken up by manual ministrations to the sick, and they cannot watch suicidal patients or those liable to escape.

3. The nursing force is not mobile enough to meet such emergencies as sometimes arise, requiring the presence of several

nurses to properly handle a violently disturbed patient, without neglecting other patients.

4. Noisy patients disturb the other sick patients, who need quiet. Sedatives are therefore necessary, and often these are bad treatment.

5. Violent or excitable patients would have to be kept in bed by means of restraint; this is often bad treatment.

6. Unless the residuals in the general hospital were under the care of a psychiatrist, their treatment would be directed by the general staff, to whom epilepsy, hysteria, delirium and insanity almost invariably mean large doses of sedatives and mechanical restraint—this is the experience at Bellevue and at Albany and accords with my own observations in the Boston City Hospital. It is often very bad treatment.

7. The general visiting staff has not the time, nor usually the interest, to make sufficiently detailed and accurate observations for the diagnosis and treament of mental cases. The house officers or internes are too inexperienced.

8. It is always possible to meet any emergency somehow, and the fact that emergencies of the kind under consideration have been met successfully in the wards of a general hospital is not a sufficient reason for thinking that they are the best or even are in general adequate to the needs of these cases.

The essential conditions to be met therefore by any community that is to look after its residuals in the best way our experience has thus far pointed out are as follows:

1. Locked wards having some guarded windows and separate rooms for patients, and capable of having portions shut off so as to segregate different classes of patients.

2. These wards should be in, or very easily accessible from, the centre of population.

3. The medical care should be under the direction of a physician, preferably resident, especially in large communities, who has had experience in the care of the insane.

4. The nursing service should consist of persons of whom at least those holding the more responsible positions should have had experience in the care of the insane.

5. The requirements for admission should be as few and as little formal as possible—the patient's obvious or stated need

should be the only absolute requirement. No certificate should be required.

6. Authority to hold a patient against his will without certificate for a specified time, as five days, should rest with the governing person or body.

In addition to these essentials it would be for the benefit of patients to have quick and easy facilities for consultation with physicians, surgeons and specialists in the different branches of medicine and surgery. This can be very easily arranged if a ward or pavilion in connection with a general hospital is used. Fractures and other surgical injuries are not uncommon as the result of suicidal or violent outbreaks; and more or less obscure or severe somatic conditions, some of them lying within the fields of the various specialties, are also frequent. It is also almost a necessity to have good facilities for at least such microscopical, bacteriological and chemical examinations as are commonly made in the ordinary examination of general hospital patients; and this need becomes absolute if patients are to be kept any length of time for treatment, as at Albany, instead of being sent elsewhere after a short period of observation, as in New York. Larger laboratory facilities are advisable if the institution is large enough to be independent, as at Giessen, Kiel and elsewhere in Germany, and more especially if first-class clinical instruction is to be given to students. If such clinics are to be held, or if patients are to be kept under treatment, they should be able to remain for different periods of time, but not to exceed four to six months. If patients are to be kept for treatment, therapeutic means of various kinds must be supplied.

Each community that intends to make suitable provision for its residuals should decide in what form it shall supply the essentials. The first thing to determine is whether the institution is to be a mere distributing centre which only gives proper care until the patient can be sent to the appropriate place of relief, or a place for prolonged observation and treatment as well. Much larger accommodations are required for the latter. In New York, considerably more than two thousand patients pass through 60 beds annually, whereas 174 patients passed through 33 beds in a year at Albany. It should be said, however, that more patients could have been accommodated at Albany. The German idea is to have

places for treatment rather than mere distributing points. Certainly if they are to be used for study or instruction, and also if they are to help prevent the congestion of the hospitals for the insane, they should have facilities for prolonged observation and treatment.

The next point to decide will be as to whether a ward or a pavilion connected with a general hospital, or a separate institution such as those at Giessen and Kiel is most desirable. This will depend largely on the size of the community. Many American cities of 15,000 to 20,000 inhabitants, and even some that are smaller, have already general hospitals. The addition of a small ward or pavilion to such a hospital might not be beyond the means of the community. Last year Dr. Clark advocated such addition in cities of that size. The difficulty would be to find an alienist to assume the charge of it. Psychiatry is so poorly taught in the medical schools of this country that there are few alienists outside of hospitals for the insane. I know a city of over 65,000 inhabitants among whose physicians there is none who has any special knowledge of insanity. This is a condition however that is being remedied and in the not far distant future it will be less difficult to supply this need. Dr. Sommer, director of the clinic at Giessen, advises that every city of 50,000 inhabitants should have an independent hospital. This is possible in Germany where psychiatry is so much better taught. Here the independent institution might well be founded only in those larger cities that have good medical schools, the pavilion plan serving even large communities well. That at Albany, for example, which draws its patients from a widely scattered population of probably 200,000, is entirely adequate for its purpose. It must be borne in mind, however, that supplying the need will cultivate a demand, and in a few years after the establishment of the ward, pavilion or hospital there will probably be a larger number of patients in proportion to the population than at first.

Finally, before closing, I wish to speak of one possible abuse of the psychiatric pavilion or hospital, which raises a sociological question. A pretty large percentage of the beneficiaries of these clinics are persons who have become for the time being social parasites through self-indulgence. I refer to the cases of alcoholism and delirium tremens. Over 26½ per cent of the patients taken

care of in Pavilion F are of that class. During their incapacity they need skilled care and nursing, and they get it. Their pathway through the mazes of delirium is rendered as easy and pleasant as their condition will allow. Sometimes it is so pleasant that delirium tremens has comparatively little terror for them. They lose one of the strong incentives of self-restraint. If drunkenness is a punishable offence, why should not delirium tremens, which makes the person more dangerous to, and more dependent on, his friends or the community, be punishable in a greater degree? Why should not the patient, after recovering from his delirium, be fined or imprisoned for having had it? Unless in some way it is made disagreeable or disgraceful to acquire delirium tremens, such excellent care as these wards or hospitals can and will supply will only serve as a premium on self-indulgence to the point of personal incapacity and dependence on the public.

A SARCOMA OF THE ORBITAL PERIOSTEUM: REPORT OF A CASE.

By E. M. GREEN, M. D.

Assistant Physician, Georgia State Sanitarium.

I report the following case because of several interesting features which it presents, namely; a malignant growth involving the periosteum of the orbit, violent maniacal outbreaks, frequent convulsive seizures and, following an operation performed 21 months ago, a restoration to a normal mental condition, a disappearance of convulsions and no return of the growth.

The patient, a negro, age 28, married and the mother of one child, was admitted to the Georgia State Sanitarium August 25, 1902.

The history accompanying her was meagre. It stated that she had been insane two months. " She was noticed to act strangely, leaving home and telling people she was treated badly at home." At times she became violent, and attempted to kill her husband. She was said never to have had a convulsion.

On examination she was found to be fairly well nourished; no disease of any organ being detected. There were present, however, eversion of the right lower eye lid, chemosis, and slight protrusion of the right eye.

Mentally the patient was somewhat exalted, had marked delusions, and hallucinations of sight and of hearing. She was cleanly, had a good appetite, slept well, and was able to help with the work of the ward.

She complained of having had severe and almost constant pain in the right eye for about three months. An ophthalmoscopic examination showed the fundus of each eye to be normal. Vision was 20/30 in each.

During the six weeks following her admission the eye-lid was scarified a number of times, hot and cold applications were made,

and the outer canthus was divided, but at no time could the everted lid be replaced. The chemosis was reduced only slightly, and that temporarily. The exophthalmos increased notably; also the pain.

At intervals of about ten days she would have a series of convulsive attacks varying in number from six to ten. These begun as a general tonic spasm, during which the face and eyes were drawn to the right, followed by clonic convulsions, which appeared to be typical attacks of grand mal.

Twice within the six weeks previous to operation she had violent maniacal outbreaks lasting for several days, during which she would shout, sing, break window-glass, and assault anyone attempting to thwart her. A day or two previous to these attacks she would say she " felt good," " felt happy," and an exalted religious element was present.

On October 22, 1902 I removed the right eye. On the floor of the orbit, on both lateral walls and filling its apex was found a mass of tissue which had caused the protrusion of the ball. This could not be removed except in small sections and, as it seemed to involve the periosteum, this was stripped from the whole cavity back to the optic foramen. The hemorrhage was easily controlled, and the patient put to bed in good condition. She complained of no pain, and rested quietly the first night. In the afternoon of the second day she became anxious, restless, and her temperature reached 100.4°. During the night she had 10 convulsions and the following day 21 occurred. Since October 24, 1902, she has had none.

Her mind began to improve at once, and apparently reached its normal condition within a few days. During the convulsions there occurred an abrasion of the skin over the left buttock; this became infected, involving the skin and the more superficial muscles. These tissues were removed leaving a large granulating surface, which was several weeks in healing.

The tissue removed from the orbit was examined by our Pathologist, Dr. M. L. Perry, and pronounced to be a sarcoma of the periosteum.

The patient's mental condition was completely restored to the normal, and she has now been at home for twelve months.

Her husband wrote me a few weeks ago that she was in good

health, her mind as good as it ever was, and that she had had no convulsions.

He said also that she had had no trouble with the left eye, no pain in the head, and that there is no growth in the cavity of the orbit, this being shallow, and in much the same condition as when she left the Institution.

THE MENTAL CONDITION IN CRETINISM.*

By EDWARD E. MAYER, A. M., M. D.,
Pittsburg, Pa.

In perusing the various text-books and monographs upon Cretinism, an interest in the subject having recently been aroused by two cases of sporadic cretinism which came under my care, I was struck by the meagre information given by most English and American writers concerning the mental condition found and the lack of unanimity in some respects concerning its relationship to other forms of idiocy and imbecility. A number of writers dismiss the subject by merely remarking that cretins are idiots or imbeciles and many seem to imply that this mental condition is a necessary attribute of cretinism, distinguished only from other forms of weak-mindedness by various physical deformities which accompany the cretin's condition, and though almost all writers to-day affirm the lack of significance in the frequently found tribasilar synthesis or the presence of epiphyses till adult life, a few still wrongly give these signs undue importance.

That athyreosis is the condition which evokes cretinism is universally accepted, but the exact factors which cause the lack of development from athyreosis are not as yet well understood, nor has the relationship between thyroid activity and other types of idiocy been well threshed out. This subject is of importance to us because in all probability it will help us in investigations of the psychoses accompanied by or due to metabolic disturbance and at least gives us some broad ideas as to the workings of the internal secretions upon psychic functions. In this paper, my attempt will be largely a review of recent investigations upon this subject.

CASE I.—S. R. was born in 1894 near Pittsburg where his father and mother and other relatives now reside. His parents are first cousins, both healthy and apparently normal. He is the third child of five, the second oldest having died very suddenly a few

*Read at the annual meeting of the American Medico-Psychological Association at St. Louis, May 30 to June 3, 1904.

months after birth and according to his mother resembled S. R. The other three children are normal. A cousin, a girl 17 years of age, has been under my care for myxedema. Alcoholism or other etiologic factors are wanting. The parents were born in Russia and are both of average build and intelligence.

CASE II.—A child 11 years of age; father, farmer and healthy; mother also strong and active, nothing etiologically elicited, except that about the time the boy was born his parents were in extreme poverty. Both these children present the characteristic facies of cretinism, the myxedematous condition of the skin and the lack of osseous development. Both have subnormal temperatures, muscular weakness and difficulty in locomotion. The second case was not brought to see me because of his cretinism, but on account of his supervening psychosis. Some months before I saw him he developed sleeplessness and agitation instead of his characteristic sleepiness and apathy. Constant irritability, crying out as if in pain, attempts to hide under the bed clothes or in the closets, refusal to eat and drink and attempts to bite any who came near, were the symptoms noticed. These manifestations were quite distinct from the emotional outbursts of anger and resentment, which he, like many other cretins, frequently had. Had the boy been of sufficient intellect I have no doubt that confusion and disorientation would have been noticed and possibly hallucinations would have been clearly in evidence. This psychosis slowly subsided under the use of thyroid extract and arsenic internally, subcutaneous injections of camphor and daily warm baths. The hemoglobin increased from 32 per cent to 65 per cent and the relative proportion of white and red blood-cells became normal. Case I was given three grains of thyroid extract daily with marked results. When I first saw him, his measurements were as follows:

Root of nose to occipital protuberance	32 cm.
Ear to ear	26 cm.
Circumference of head	53 cm.
Height	98 cm.
Abdomen	62 cm.
Chest	54 cm.

Cephalic index 81 per cent, therefore brachycephalic. His weight decreased in three months from 37½ lbs. to 35½ lbs. His genital organs were entirely undeveloped. His teeth were as well de-

veloped as those of any boy of nine years. The pads of fat in the supraclavicular areas disappeared as did also his protruding pouch-like belly. His umbilical hernia also disappeared and his bowels from being obstinately constipated evacuated themselves daily. He soon began to increase in height, so that in the six months he has been under treatment he has gained over two centimetres in stature, and only weighs one pound less than he did when he first came under treatment. His height is now 100½ cm., his abdominal girth 45 cm., his weight 36½ lbs. He wore 5½ shoes six months ago, at present he requires No. 8 and now can be fitted with ready-made clothes. His arteries were hard and after the administration of thyroid had removed the superficial fat, the left external carotid artery stood out tortuous, twice almost doubled upon itself and as hard as a pipe stem. Before the administration of thyroid he presented the characteristic torpidity and stupidity so often noticed in cretinism. Manifestly, however, his intellect had not been of a very low grade, because he had always answered questions by "No" or "Yes" and would sit for hours making very fair attempts at drawing. He could count up to ten and was able to name different objects around the house. Under the administration of thyroid extract, his ability to speak rapidly augmented. He became restless. His motor strength increased. He became mischievous and curiously no longer would sit and draw. He now is about on a par with a five-year-old child, has a bright intelligent countenance and plays with the children of his stature and intelligence. His hemoglobin percentage was 22 when I first saw him and now it is 70. I made no blood-counts in this case. He still has the saucerlike hands, and broad and thick lower jaw seen in cretin children, but otherwise looks normal. In both cases, the thyroid treatment raised the bodily temperature and the pulse rate.

In case II, while his psychosis has disappeared, there has been but little improvement intellectually from the use of the thyroid extract. He has lost considerable weight, has gained a little height, the physical signs accompanying cretinism are no longer as strongly accentuated, but improvement has been very slow.[1]

[1] A third case, a patient now under the care of Dr. Heard of Pittsburgh, I saw this winter through his kindness. This boy was started on thyroid

The mental condition of cretins is in most cases that of an apathetic, anergic imbecile. We find all grades of mental enfeeblement from the purely vegetating animals represented by the endemic cretins (Pflanzenmenschen of Kocher) to the highest grade of imbecility; some few sporadic cretins are of normal intelligence. The hopelessly idiotic lead little more than vegetative lives, are completely anergic; lie for hours without moving; if placed in the sun will sit staring at it hour after hour, doing nothing except perhaps showing anger or hunger. On the next plane we find cretins who intellectually evince slight interest in familiar faces or surroundings, but who are absolutely dependent upon others. They may show some pleasure in eating and drinking and seem to remember the one who brings them their food, swallowing hastily anything brought without stopping to chew it. They may make slight attempts at speech, but articulation is difficult, owing somewhat or perhaps entirely to the swelling of the tongue and of the mucous membrane of the mouth. They understand little of spoken language even when not deaf. They resist all efforts to make them move or to attend to bowel or urine functions. If upon a little higher plane, they show some interest in the surroundings, will remember the names of members of the family or attendants, do not forget any one who has harmed them and can be disciplined. They prefer to be alone, do not worry and are always passive. If physically strong enough, they can be put to light work. Weygandt remarks that they seem to like to beg, but this is a common characteristic of the feeble-minded.

gland about five years ago by Dr. Pool, his physician at that time. He has gained about six inches in height, has developed from an anergic idiot to a docile, fairly active boy and his intellect is now on a par with any boy of his present size. The height is now 46 inches; abdomen 26 inches, circumference of head 21 inches, from root to nose to external occipital protuberance 14 inches, and from ear to ear 9½ inches. The only other case that I have heard about in Western Pennsylvania was one verbally reported to me by Dr. T. J. Eltrich. In 1803, Harris in his "Journey of Tour in Territory Northwest of Alleghany Mountains" comments upon the many cases of goitre and cretinism in this region, but in a later book (1817), it is asserted that "the goitre or swelled neck has disappeared; the cases which excited the apprehension of the stranger no longer exist to gratify his curiosity. In a few cases it was connected with cretinism and in every case where the experiment was tried the swelling was removed by a journey and change of air."

Cretins then are often very imbecile, but it is wrong to assume with Ziehen,[2] Ewald,[3] Sachs,[4] and others that this is the constant feature. Ziehen even goes so far as to insist that cretins are generally idiotic rather than imbecilic. But the mental condition differs from that of ordinary idiocy or imbecility in that there is a certain hampering of, or inability for, mental effort rather than the incapability of thinking found in ordinary idiots.[5] Most cretins can elaborate thought though very slowly, but the deafness or difficulty in hearing which is generally present may make speech difficult or impossible. The cause of this deafness is often not central, but peripheral, due to swollen pharyngeal tonsils, edema of the Eustachian tube or closure of its opening.[6] If a cretin can hear well, he may attain the mental capacity of the children of his surroundings or be even on a higher plane.[7] If his tongue and mucous membrane were normal, he would be able to progress more than he generally does. But beyond this stage of childhood he cannot rise on account of these factors. Even without thyroid medication, as was shown in earlier years, if the condition is recognized early, the cretin is capable of more training than other imbeciles. The great apathy present is the worst factor to contend with. There is a secondary functional inability to act, quite different from the[8] "negativism and aprosexia of the erethetic, versatile, excitable forms of idiocy and the apperceptive inability of the anergic forms often functionally produced." Bayon seems to be the only writer who rightly emphasizes the fact that we are all born idiots and that if, as in cretinism, anything should stop our mental development we would remain so. On the other hand, if

[2] Pentzold and Stintzing: Handbuch der Therapie, 3rd Edit., VI Vol., p. 347.

[3] Ewald: Diseases of the Thyroid, etc., Vol. 22, Nothnagel's Special Pathology.

[4] Sachs: Nervous Diseases of Children.

[5] Sommer (Diagnostik der Geisteskrankheiten) groups cretinism as a lack of development due to thyroid intoxication and Kræpelin also includes it among the intoxications.

[6] Brühl and Nawatzni: Rachenmandel und Gehörorgane der Idioten. Münchener Med. Woch., 1903, No. 26, p. 1135. See also Weygandt, l. c.

[7] Case of Martin Ebert, for instance, cited by Bayon.

[8] Bayon: Diagnose und Lehre von Cretinism, p. 14, Würzburg, 1903.

at the age of ten or twelve years, hypothyreodism developed, the boy or girl would not progress but would retain the mental development acquired before that age. A recent study of the mental state in myxedema by H. Wolseley Lewis, Lancet, April 23, 1904, expresses the similar conditions which come on in developed brains, if we consider the difference in brain-power to start with. He says: "Memory for recent events is generally good; apprehension is fair; coherence of thought good; reasoning power sound; consciousness clear; and the essential change in the patients lies in a deficient power of energizing their motor cells. They complain that they are languid and tired and tell of the immense effort it is to them to make even the simplest movement. It is essentially in disturbances of volition and action that the peculiar mental symptoms of this condition manifest themselves. A diminution of volitional impulse produces that lack of initiative, that striking immobility of face and body so characteristic of the disease."

In the consideration of cretinism one fact stands out strongly, namely, that all the symptoms and conditions found are due to a disturbance of metabolism and that this is the result of inefficient activity of the thyroid gland. What substance elaborated by the thyroid glands fails to be secreted or what antiferment normally present is no longer found to act upon certain toxic substances in the blood and lymph is not known, but the results of many investigators (Anderson, Boit, Magnus, Levy, Girber) prove that extirpation of the thyroid gland disturbs the nutrition of the body and that the administration of the thyroid gland increases metabolism. That this disturbed nutrition is the basis of the defective mental development in cretinism, as well as of the other signs of lack of development, is plain. In other words, imbecility in cretinism is always at first of a functional nature and, therefore, can always within certain limitations as to the length of time the imbecility has existed be cured or at any rate improved by the administration of the thyroid gland, which introduces into the system that something which has caused a lack of development.

There are few post-mortems upon cretins described in the literature, Osler and Barker, Packard and Hand[9], Hanau,

[9] First to call attention to calcareous deposits in blood-vessels.

Langhans and de Coulon having described their findings. But all of them are silent as regards the brain-cells and fibres. Lately Bayon and Weygandt have interested themselves in this important question and their results will be given later on.

It is true that some older reports have shown the presence of atrophy, asymmetry or hydrocephalus of the brain, but that was at a time when cretinism was frequently confused with idiocy. It is well known that the cells of the brains of idiots are often of an embryological type (the globose cell of Bevan Lewis) and Nissl has described pathologic changes which are not, however, constant in the brains of anergic idiots (low development of cortex, absent cells, etc.) Weygandt[10] and Bayon have lately described a case of cretinism in which the brain cells were not normal. "Nissl's method showed the nuclei of the nerve cells but faintly and smaller than normal. The axis cylinder was not visible, the dendrites but faintly. The apical dendrites (Spitzenfortsätze) were remarkably long, while in Golgi preparations the cortical ganglion cells sent their processes normally to the cortical periphery. In a normal Nissl preparation the apical dendrite is only indicated; in senile dementia, it is visible to about the same length as that of the cell itself; while in a cretin brain its length is about the same as that of the cell. I have found the same condition in Nissl preparations of an old cretin brain which for years lay in the Würtzburg pathological collection. I have also found similar cortical pictures in a series of thyroidectomized dogs. The nuclei were colored, the cell bodies were only present in a few places or absent entirely, the glia was increased, the apical dendrites of the ganglia cells appeared here also to be considerably increased."[11] Hecktoen says that the arrangement of the cerebral convolutions in cretinism is often peculiar. Mills speaks of some of these peculiarities but neither recites cases to show where such conditions were found in true

[10] Der Heutige Stand der Lehre von Cretinismus, 1904. Sammlung Zwinglose Abhandlungen aus dem Gebiete der Nerven- und Geisteskrankheiten. In an article in the April number of the Neurologisches Centralblatt of this year, he shows how even recent writers have wrongly followed Virchow's views.

[11] Weygandt: l. c. Bayon does not believe this condition to be peculiar to cretinism, but claims to have noticed it in specimens from patients with simple dementia and from normal sections from Broca's convolution.

cretins. Bayon says:—"The brain of the cretin is neither too hard nor too soft, it is similar to that of a child of his cretin age; I mean by that, in contrast to his real age, the age of the individual anatomically and morphologically. I cannot at present say anything positive concerning microscopically observable alterations as my investigations have not been completed, but the alterations will not be those found in the acute poisoning known as tetany thyreopriva, nor those found in acute and chronic alcohol poisoning."

The evolution of the conception of thyroid activity is interesting, but cannot be given in extenso in this paper, except to remark that thyroidectomized animals show similar symptoms to cretins, that their arteries calcify, their growth is stunted and that they become apathetic, that the administration of thyroid gland in normal individuals hastens the process of repair in fractures (Bayon), that the thyroid gland has an influence upon the central nervous system and upon metabolism (Horsley, Macalister, Leichtenstern, etc.), that it has blood-forming properties (Kocher, Bruns, Credé, Murray etc.), lowers blood-pressure in arteriosclerosis (Starr), that replantation in the peritoneal cavity of thyroid glands offsets the removal of the gland in animals, and that it influences the development of the sexual organs and desires (Guillot, Lawson Tait, etc.).

Telford Smith discusses the question of whether the defective function of the thyroid is an appreciable factor in the causation of idiocy. He gives us, however, no conclusive evidence except as to the result of the administration of the thyroid gland in such cases. He reports, as does Kassowitz, in Mongolian idiocy improvements of a physical and mental kind varying inversely as the age of the patient. This improvement was not as rapid or as marked as in cretins. He also reports improvements in other types which are apathetic and disinclined to movement or speech and in which there has been evidence of diminished metabolism. There is less apathy and speech becomes spontaneous.

Osler [12] in his complete and valuable report upon sporadic cretin-

[12] Osler's paper in 1893 may be said to be the first scientific paper upon cretinism written in this country and served to arouse interest for the first time among American physicians on this subject.

ism in America in '97 says that the question of diminished or perverted function of the thyroid gland in causing the mental or bodily defects in ordinary idiocy is one deserving of careful study, but such study has not as yet been successful in deciding the question. An analytic study of those degenerative mental diseases in which we have retarded development is, however, no more important in the solving of these questions than that of diseases in which later in life as the result of disturbed nutrition, as well as of thyroid glandular inactivitiy, we get mental decay. Inasmuch as we have lately come to look upon paralytic dementia as a general disease in which we find profound changes in metabolism [13] (Kraepelin, Robertson, Bruce, Jeffries, McCrae), it is interesting to note that Weygandt calls attention to the fact that in both paralytic dementia and cretinism we find the same triad of skeletal, skin and psychic changes.

Weygandt also calls attention to analogous conditions found in dementia precox. Here as is well known we have a progressive psychic disturbance deepening into dementia accompanied by disturbances of other organs of the body. Kraepelin in his psychiatry, calls attention to acute variations in size of the thyroid gland in dementia precox and Chovstek's facial reflex is often noted in both diseases.

" In chronic cases of dementia precox we often," says Weygandt, " note a gray yellow skin, pasty, doughy, reminding us of myxedema at first glance." But such conditions may be found in any chronic degenerative disease where metabolism has failed and the fatty deposits are never elastic and appear upon the skin and stomach where fat accumulates in sedentary people.[14]

[13] Due according to Bruce and others to a toxemia of gastro-intestinal and bacterial origin, syphilis being a stimulant of the leucoblastic tissue so that the natural defences of the body against the invasion of bacteria are diminished.

[14] Alex. Paris in Archives de Neurologie for February, 1904, attempts to explain epilepsy as being a condition whose symptoms are just the opposite of cretinism and therefore due to an opposite condition of the thyroid gland. His contentions are true in so far as goitre is rare in epileptics and epilepsy rare in goitrous or cretinous regions, that the administration of thyroid gland makes epilepsy worse and that we often find an increase in size of the thyroid gland at puberty, the menopause, etc., but that is as far as his explanation goes.

The form of idiocy which resembles cretinism most strongly—Mongolian idiocy—has been the subject of considerable discussion and its characteristics are now well understood. Both represent conditions of unfinished development, Mongolism being, however, always an antenatally arrested development and cretinism being generally acquired after birth. In both conditions we may have the same muscular weakness, stunting of growth, lowered vitality and body temperature, protruding abdomen, constipation, hernia, depressed bridge of nose, small palpebral fissure, protruding tongue and inarticulate speech. In both of these affections certain physical peculiarities have been noted and described. The incurvation of the little finger,[15] the transverse or irregular fissuring of the tongue, with hypertrophy of the circumvallate papillae and a contracted arch have been dwelt upon in connection with Mongolian idiocy, and a thickened spade-like hypothenar eminence like that seen in lower animals in cretinism, by Koplik and Levinstein. These signs have been denied by some, but if present, as they undeniably are in many cases, they can only be regarded as degenerative stigmata.

Osler[16] questions the observation of Telford Smith concurred in by others, that Mongolian idiots are slow and deliberate in movement and eventually apathetic and from observations with Kerlin at Elwyn believes them to be " vivacious, often very sprightly and mischievous." Weygandt[17] claims they are apathetic when young, and become erethetic later on.

The following differential diagnosis is after Sutherland:

[15] This incurvation is noticed in defectives and imbeciles of all kinds in as great a proportion as among Mongolian idiots (Fennel, Journal Mental Science, January, 1904).

[16] Sporadic Cretinism in America. Transactions Congress American Physicians and Surgeons, 1897.

[17] Op. cit.

Cretinism.	Mongolian Idiocy.
1. Characteristic features seldom present before sixth month.[18]	1. Present at birth.
2. Dull, apathetic, impassive.[19]	2. At first apathetic they later become imitative, fairly active but are shy.
3. Swollen, dry skin, fatty deposits, coarse and scanty hair.	3. Absent.
4. Large swollen protruding tongue.	4. Large, often protruding but not swollen.
5. No characteristic skull changes.	5. Skull flattened antero-posteriorly, brachycephalic.
6. Swelling of eyelids causes small palpebral fissure.	6. Palpebral fissure small without swelling of eyelids.

It is not the purpose of this paper to consider the different forms of diseased growth which might be confused with cretinism. We might mention, however, that Bayon [20] has written an interesting article showing that the cases of intra-uterine cretinism that have been published were probably cases of congenital rickets or foetal chondrodrystrophia. Achondroplasia has nothing except stunted growth in common with cretinism. Infantilism may be associated with disturbed thyroid function, but cretinism is more than infantilism, it is infantilism + myxedema.[21]

No statistics have been made concerning the effects of continued thyroid administration as the further histories of cretins do not

[18] Bayon calls attention to the fact that in Bohemia this type of face is the normal race type.

[19] Shuttleworth aptly says: "The facial expression of Mongolism is one of secret joy; of cretinism, one of secret sorrow."

[20] Lancet, April 16th, 1904, p. 1051.

[21] Meige's classical description of Brissaud's type of infantilism, the myxedematous type, is practically as follows: "Full round face, fleshy, protruding lips, small nose, expressionless face, thin, tender skin, slight growth of hair, long cylindrical body, protuberant stomach, excessive amount of skin, rudimentary sexual organs, thin high voice, small thyroid, childish intelligence." In this type dwarfism is not a fundamental sign as in the other type of infantilism (of Lorain). See Ferrannini, Archiv für Psychiatrie, 1904, Bd. 38, p. 209, and Brissaud, Leçons sur les maladies nerveuses.

seem to have interested many reporters sufficiently to publish them later on. But it would seem that the gland must be given continuously except for short intermissions, though in some cretinoid conditions in early life the gland given for a short time seems to have permanently restored normal glandular activity. From some reports (Gregor) if the glandular extract is pure, the child can stand an enormous dosage without ill-effect; but if this is so, much of the thyroid extract that is in use is impure. The rise of temperature noticed (Cotton) in its use is probably the result of an impure extract.

That Osler's articles in 1893 and 1897 have awakened interest in cretinism in this country is shown by the number of cases reported since 1897, which are herewith appended.

1. ACKER, GEO. N., Washington. A Case of Myxedema. *Med. Record,* June 27, 1903, Vol. 65, p. 1037. 2 years old. Normal until 18 months old; after an attack of diphtheria its appearance began to change. Did not know its mother; face devoid of all expression. Improved under treatment.

2. ADAMS, J. L., Morgan, Minn. A Case of Sporadic Cretinism. *Pediatrics,* April 1, 1898, Vol. 5, p. 287. Female. 5 years. An imbecile. Disease recognized when 3¼ years old. Treatment begun October 23, 1896. ¼ tablet dessicated thyroid t. i. d.; increased every 5th day by ¼ of tablet. "Marvelous change." Jan. 15, 1897, la grippe and bronchitis. March 1st treatment resumed. 2 weeks later trembling of lower jaw. Treatment discontinued for 2 weeks. Disagreeable symptoms did not return. Last 4 months improvement slow. From a state of idiocy to a condition where she walks awkwardly, speaks a little, tries to sing and whistle, does what she is told, dresses herself, etc. Parents not always strict about treatment.

3. BARBOUR, PHILIP F., Louisville. A Case of Sporadic Cretinism. *Pediatrics,* May 1, 1901, Vol. 11, p. 327. Female. 5 months. Typical symptoms of Cretinism. Now 1 year old. Expression bright, playing with her little sister and in other ways showing her great and marked improvement.

4. BEARD, F. M. Cretinism, with report of a Case. *Practitioner and News,* Louisville, July 1, 1903.

5-7. BIERHOFF, FREDERICK, New York. The Recognition and Treatment of Early Myxedema in Childhood. *Jour. Am. Med. Asso.,* Nov. 19, 1898, Vol. 31, p. 1208.

Case I.—Female. 8½ years. First seen Jan., 1897. A well-marked tumor which corresponds to the location of thyroid gland; first noticed 2 years ago, steadily growing, memory failing. April, 1898, tumor entirely disappeared. Treatment stopped. Tumor appeared. Treatment renewed.

Case II.—Male. 11 years. Hungarian. Seen 1897. Thyroid gland enlarged, has been so for 4 years. Mother has a goitre. Tumor diminished in size. Mother stopped treatment.

Case III.—Female. 14 years. Disease began 3 years ago. Slight thyroid enlargement; dull, had to be taken out of school. Disposition completely changed. Treated for 1 year. General physical condition improved. Mental condition improved slowly but steadily.

8-9. BOVAIRD, D., N. Y. Academy of Medicine. Two cases of Cretinism. *Pediatrics*, Oct. 15, 1901, Vol. 12, p. 313.

Case I.—4 years. Typical cretin. Under treatment 7 months. Did well.

Case II.—2 years. A less typical appearance of cretinism. Under treatment 3 weeks. Improving.

BURNETT, S. G. Case of Infantile Myxedema. *Kansas City Med. Record*, August, 1900.

10. CARPENTER, H. B., Phila. A Case of Cretinism. *Archives of Pediatrics*, Aug., 1898, Vol. 15, p. 628. Female. 5 years. Presented at Phila. Pediatric Soc. before 18 months' treatment. When first seen looked about 1 year old, could neither talk nor walk. Now she walks, talks, "and one would not think her a cretin."

11. COOPER, ST. CLOUD. A Case of Cretinism. *Memphis Med. Monthly*, June, '99.

12. CLARKE, JAS. FRED., Fairfield, Iowa. *Jour. Am. Med. Asso.*, April 26, 1902, Vol. 38, p. 1102. 20 years. "A marked imbecile of typical cretinoid condition." Under treatment 9 months; gained 2¾ in. in height. "A marked transformation as to intelligence and physiognomy."

13. CLARK AND MCGREER. A Sporadic Case of Infantile Myxedema Resulting in a Cretinoid Condition. *Med. Fortnightly* (St. Louis), May 26, 1902.

14. DAVISSON, ALEX. H., Phila. A Case of Cretinism showing the Results of one year's treatment. *Phila. Med. Jour.*, Oct. 25, 1902, Vol. 10, pp. 602-604. Female. 3 years old. Normal until a "cold" at 4 months old. First seen, 2 years, 1 month old. Thyroid gland could not be felt. Treatment stopped during a severe attack of measles. Marks of cretinism all less apparent than a year ago. Expression bright and cheerful.

15-17. De Witt, J. P., Canton, Ohio. Sporadic Cretinism, with Report of Cases. *Cleveland Med. Jour.*, Aug., 1903, Vol. 2 pp. 365-368. 3 cases.

Case I.—Male. 2 years, 4 months. Cretin from birth. Mental condition undeveloped; could not palpate thyroid gland. 2 years, 10 months. Fine, healthy appearing boy. Bright as others.

Case II.—Female. 4 years. Since birth, undeveloped mentally. Could not feel thyroid gland. 8 months' treatment. Improved at once.

Case III.—Male. 7 years. Cousin to Case II. Developed physically but not mentally. Under treatment 4 months. Developing mentally and has gone to school the last 2 months.

18. Engelmann, Rosa, Chicago. Sporadic Cretinism in Children, with Report of a Case. *Jour. Am. Med. Asso.*, Feb. 14, 1903, Vol. 40, pp. 430-435. Male. 7 years. Myxedematous idiot, size of a 3 year old child. First seen March 27, 1900. Grown 4½ in. Talks quite fluently. More intelligent.

19. Freeman, Rowland G., New York. Sporadic Cretinism. *Archives of Pediatrics,* Aug. 1900, Vol. 17, p. 595. Female. Ceased to grow at 5 months. Evidences of Cretinism disappeared in 47 days.

20. Given, E. E. W., Phila. Pediatric Soc. A Case of Cretinism. *Archives of Pediatrics,* Feb., 1899, Vol. 16, p. 120. 12 years. Born in Ireland. Mental condition equal to that of a child of 7 or 8. Treatment from Nov. 29 to Dec. 13, 1898. Improving. Dr. Given and Dr. Robertson not positive that it is a case of cretinism.

21. Graham, Christopher, Rochester, Minn. Cretinism, with a report of a case of the sporadic variety. *Pediatrics,* March 15, 1900, Vol. 9, p. 228. Male. 5 years, 8 months. Had never tried to walk, nor speak. Diagnosis of cretinism. First seen in June. Began to walk and talk during the winter. March, walks everywhere. Fairly bright and playful. Most marked feature is growth.

22-24. Gordinier, Hermon C., Troy, N. Y. Sporadic Cretinism, with report of 3 Cases. *N. Y. State Med. Jour.*, Oct., 1903, Vol. 3, pp. 391-395.

Case I. Male. 9 years. Under treatment, has "shown no evidence, either mentally or physically, of the disease for over 18 months."

Case II. Male. 7 years. Under treatment 1 year. "Marked improvement physically, but less mentally."

Case III. Female. 20 years. No treatment until last winter, improved remarkably both mentally and physically.

25. Hamill, S. M., Phila. Pediatric Soc. A Case of Cretinism. *Pediatrics,* June 1, 1901. Vol. 11, p. 436. 6 months. Italian parentage. Typical Cretin. Under treatment 3 weeks. "Appearance of the child has changed remarkably."

26. HERMANN, New York. Sporadic Cretinism. *Archives of Pediatrics,* Aug. 1900, vol. 17, p. 596. Age 7 weeks. 2 other children cretins. Described by Dr. Koplik in 1896. Baby under treatment.

27. HIRSH, J. L., Baltimore. A Case of Cretinism. *Medical News,* April 25, 1903, p. 808, Vol. 82. Female. 5 years old. Dull and even idiotic. Improvement noted in 4 weeks. Could stand like a year old child. In 3 months, mental condition had markedly improved. More after 1½ years treatment like any other child of 6. Mental improvement the most striking thing.

28. KENT, S. T. A. Cretinism with report of Case. *Virginia Med. Semi-Monthly,* Dec. 12, 1902.

29-30. JELLINAC, San Francisco. *Jour. Am. Med. Asso.,* Nov. 26, 1898, Vol. 31, p. 1304. Sporadic Cretinism. 2 Cases.

Case I. Female. 4 years, 2 months. "Perfect picture of cretinism." No thyroid gland. Treatment begun Aug. 26. Improving rapidly.

Case II. 5½ years old. Much the same as first case. Under treatment 13 months. Marked improvement. Treatment begun July 26, 1897.

31. LEWI, EMILY, New York. Congenital Cretinism. *Archives of Pediatrics,* Feb. 1898, Vol. 15, p. 134. 2 Cases. Brother and Sister. Boy under constant observation and treatment since 15 months old. Treatment of infant sister began at 5 weeks and already in better condition than the boy.

32. LINDSAY, CLIFFORD. Case of Sporadic Cretinism. *Medical Standard,* Chicago, May, 1902.

33-50. MACPHERSON, ALEX. Sporadic Cretinism in Ontario, Can. *Journal of Med. and Surgery,* IV, pp. 275-1898. 17 Cases.

51-52. MILLET, CHAS. S., Brockton, Mass. Cretinism. *Boston Med. and Surg. Jour.,* Oct. 10, 1901, Vol. 145, pp. 400-402. 2 Cases.

Case I. Male. 9½ years. Typical Cretin since 1 year old. Under treatment 4 years. Grown 15 in. Does not yet put words together. Memory strangely lacking.

Case II. Female. 32 years. Disease began at 10 years. 4 years ago took thyroid treatment with decided improvement. Neglected it. Retrograded and now shows all the symptoms.

53. MILLS, WALTER SANDS, New York. Cretinism. *N. Y. Med. Jour.,* Feb. 22, 1902, Vol. 75, pp. 325-327. Female. 26 years. Had some form of thyroid treatment for two years, 1896-1898. First came to Dr. Mills, Sept., 1900. Mentally like a child of 6 or 7. Bad tempered and egotistical. Nov. 1901, improved physically. Not much

improvement mentally. Better tempered. Case reported at length as it shows the tendency to retrograde when treatment is stopped. Also the value of treatment in older subjects.

54-55. MORSE, J. S. *Annals Gyn. and Pediatric,* Vol. 13, No. 7. Two Cases of Sporadic Cretinism.

Case I. Male. 2 years old. Russian parentage. Improved under treatment.

Case II. Female. 4 years old. Russian parentage. Treated for 3 months. Appetite failed and treatment discontinued. Child disappeared. Reviewed in *Archives of Pediatrics,* Aug., 1900, Vol. 17, p. 626.

56. NORBURY, FRANK P., Jacksonville, Ill. *Jour. Am. Med. Asso.,* April, 26, 1902, Vol. 38, p. 1102. Male. 9 years. Patient seen by him in consultation. Fed on thyroidin. Result satisfactory and pleasing. Reported at *Tri-State Med. Soc.* (Iowa, Ill. and Mo.)

57. NEWELL, F. F., Burlington, Wis. A Typical Case of Sporadic Cretinism. *Med. Record,* Dec. 5, 1903, Vol. 64, p. 896. Male. 13 years. Symptoms first appeared at 9 months. Dull, could not talk, walked in a clumsy way, under treatment 7 weeks. Results marvelous. Expression of face changed. Grew 1 in. Tried to walk. Took more interest in things.

58. PALMER, F. B. How much may we Expect from Treatment of Cretinism? *Jour. Med. and Science,* Vol. 4, No. 4 (1900), mentions several cases.

59. NOYES, WILLIAM B., New York. Sporadic Cretinism. *Archives of Pediatrics,* Aug. 1900, Vol. 17, p. 596. Female. First seen Sept. 1, 1895. 2 years old and looked like a 6 months old baby. Nov. 24, improvement wonderful, looks like a child 1 year old. Oct. 17, 1896, treatment discontinued, and developing cretinoid symptoms. Child has learned to walk, trying to talk. Looks bright. Only suggestions of cretinism appears in the thick upper lip.

60. PACKARD, FREDERICK A., and ALFRED HAND, JR., Phila. A Contribution to the Pathological Anatomy of Sporadic Cretinism. *Am. Jour. Med. Sciences,* Sept., 1901, Vol. 122, p. 289. Male. 6 years. First seen Dec. 7, 1897. Idiotic and undeveloped. Unable to walk or talk. 9 days after admission decided improvement noted. April 1898. Bright and active "and in every way active quite naturally." November, 1898. Could stand. Learning to talk. Improved in appearance and intelligence. Died Nov. 12, 1898. Ill one week.

61. SHIELDS, EDMUND, Cincinnati, Ohio. A Case of Cretinism following an Attack of Acute Thyroiditis, *New York Med. Jour.,* Oct. 1, 1898, Vol. 68, p. 476. Female. 6 months old when disease began now 7 years. Typical Cretin. 18 months treatment. Marked improvement.

62. PRICE, EZRA O. Case of Cretinism. *Indiana Med. Journal*, Oct., 1902.

63. SINKLER, WHARTON, Phila., Pa. A Case of Sporadic Cretinism, *Phila. Med. Jour.*, June 4, 1898, Vol. 1, pp. 1063-1065. Female. 30 years. Size of a child of 6 or 7 years. Case briefly reported at Am. Neurological Assn., 1896, Referred to by Dr. Osler at Congress Am. Phy., 1897. Worthy of full report on account of remarkable improvement. Gained 3 in. in height. 4 teeth were cut. Physical appearance much better and decidedly brighter intellectually.

64. PRESBURG. Annals of Gynecology and Pediatry, May 1899.

65-66. TOWNSEND, C. A., Boston. A Case of Congenital Cretinism. *Boston Med. and Surg. Jour.*, Jan. 12, 1899, Vol. 140, p. 37.

Case I. Female. 2 years, 5 months. Shows all the appearances of a Cretin. Thyroid gland cannot be felt. Under treatment 2 weeks. Improved in appearance already.

Case II. 4 years. Unable to stand. Thyroid gland could not be felt. Under treatment two years. Marked improvement physically and mentally.

67. WALLS, FRANK X., Chicago. Cretinism and Thyroid Treatment, with Report of a Case. *Jour. Am. Med. Asso.*, Jan. 20, 1900, Vol. 34, p. 169. Female. 16 months. Treatment begun Dec., 1898. Child has lost all the marks of cretinism. Bright, pretty and intelligent.

68. WANS, M. H. Cretinoid Myxedema. *Western Med. Review*, May, 1901.

69. WHITE, FRANKLIN W., Boston. A Case of Sporadic Cretinism. *Boston Med. and Surg. Jour.*, March, 16, 1899, Vol. 140, p. 257. Female. 2 years. Practically an idiot. No thyroid gland was felt, but there was no notable thyroid depression.

70. WOLFSTEIN, D. I., Cincinnati, Ohio. Infantile Myxedema. *Am. Jour. Med. Sciences*, March, 1898, Vol. 115, pp. 300-312. Female. 4 years, 6 months. Never walked. Looks like an imbecile. Thyroid extract for 1½ years. Walks well. Looks almost like any other child. Mental condition greatly improved. Intelligent and able to talk. Author says: "might justly be termed miraculous."

71. WRIGHT, J. C. Thyroid Extract in Cretinism. Report of a Case. *Austin Flint Med. Journal*, Mason City, Iowa, June, 1900.

72. KELLY, W. D., Cretinism. *St. Paul Med. Jour.*, 4, 1902, p. 324.

73-75. Three cases at Penna. Asylum for Feeble-Minded, Polk, Pa. Reported to writer by Supt. F. Moorhead Murdoch.

SENSATION AND MOTION.

By FREDERICK C. GESSNER, M. D.,

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Applying ourselves to the study of nature's phenomena, we are confronted by a vastness of variety, in which, nevertheless, the close observer cannot fail to recognize a multitude of analogies. Forms vary, and at the same time express some kinship; modes differ, and still present similarities; the dazzling kaleidoscope of life reveals its causality; complexities evolve from units, and we begin to realize an all-embracing entity, appealing to us like endless variations of an eternal theme, which is often distinctly felt, more often but vaguely suspected. We become philosophers, scientists and artists, striving to learn to explain and to apply, and finally recede to the fundamental question, " what is life, what is energy? "

In order to gain a broad knowledge of things, we must not be specialists; it is not enough that we explore, analyze and test, we must also compare, recognize and conclude. Philosophic speculation has often born out metaphysical monstrosities, because it had lost touch with the reality of things, but scientists have tended to fall into the other extreme, and while they were compiling data, their views for wider scopes became more and more clouded. Facts revealed by experiments are highly valuable, not so much in themselves, as in opening the gates to those who are capable of abstracting them into far-reaching conclusions or theories. Any theory which adjusts itself with ease to explain the greatest number of phenomena, stands indeed next to a law of nature. All natural laws are, or at least have been, theories at one time.

Approaching the topic of vital functions among which that of the human mind stands preeminent we study its substratum, the nervous system, and appreciate the work done by anatomists, who with the aid of microscope and staining-methods have given us

an idea of its wonderful make-up. But morphology is too limited and therefore does not give us complete satisfaction. We may, with the aid of better microscopes, be able to see more delicate forms, but the best microscope will not reveal to us the soul of form, or that inherent energy which expresses itself in the display of form. We resort to physiology and biology, as these branches of science promise a better understanding of the animate world, but soon we realize that in order to understand the complicated, we must have an understanding of the simple, and it becomes imperative, that we take recourse to those sciences which deal with the elementary properties of substance in general.

Herbert Spencer defines "Life" as the continuous adjustment of internal relations to external relations; now let us consider substance in general, and see, whether that dictum may be extended to the so-called inanimate world. Life as well as energy are manifestations which cannot exist independent of substance. What we call life in the animate has its analogon in the energy of the inanimate. Energy is the intrinsic property of all substance from which it cannot be separated. Energy in its various forms can be traced to the common root of motion. It is a universally accepted theory that the various forms of energy known to us, for instance, as heat, light or electricity are definite modes of motion of infinitely small particles of substance. Motion then is the ultimate unit, and at the same time the limit of an objective conception of energy. But, although we have reduced the various forms of energy to vibrations of substance, although we have ascertained with mathematical precision, their velocity and wave-lengths, have we thereby advanced one step toward the explanation of sensory phenomena? We may, for instance, define light as a mode of motion, but what conclusion can we derive from that to explain light as a mode of sensation?

To attempt an explanation of the phenomenon of sensation, which is so indispensable in our conception of life, we may consider energy under two relative denominations, namely, objective and subjective; or energy objectively manifest as motion, and subjectively manifest as sensation or sensibility. Motion then becomes the objective aspect of that which is only subjective, namely, sensation.

In the event of our ego we realize an exquisite sensory phenom-

enon. All our perceptions, our thoughts and emotions, even the motions of our body and the cognizance of our existence are to us modes of sensation. The life of each individual is in itself a series of sensations of a more or less complex character.

Now imagine an atom and its intrinsic energy; we know it only from its objective aspect, which reveals its existence ultimately, as a body in motion; of its subjective existence we know nothing, unless we imply it by analogy. Now let myriads of atoms gather to build up the nervous system of a living being, and there is brought into existence an ego, which has sensation toward which each of the constituent atoms has contributed its share. If millions of atoms make up an organism which has sensation, why should we deny sensation to the individual atom, be it ever so minute? To assume atomic sensibility is only a logical conclusion, but by no means a novel one. As organization ascends in evolution, we see complexity and coordination, of motion and sensation, simultaneously rise to higher perfection; both phenomena are so inseparable, that we are forced to the assumption that motion is the objective expression of sensation, which is always subjective.

After having conceded sensibility to the unit of matter, because we found sensibility in the coordinate complexity of units, the organism, we may proceed to illustrate the relation of sensation to motion.

A vibrating tuning-fork, for example, is objectively a body in motion; by its immediate contact with the surrounding atmosphere, it sets the latter into motion, producing definite waves, while each atom, or group of atoms, evokes similar motion in its neighbors, until perchance the acoustic nerve, and along it the centers of hearing in the brain are reached. At that moment the vibrations cease to be objective, they become subjective, and at the very instant when they change their relative denomination from the objective to the subjective, they change into sound. The appreciation of sound is a phenomenon of life, it is, to express it in the language of Herbert Spencer, the adjustment of an internal or subjective relation to an external or objective relation; in other words, it is an example of the adjustment of sensation to motion.

As a matter of fact, each of us is cognizant only of his own sensorium; he knows nothing of the sensations of his fellow creatures,

unless he imply them by analogy. How then, is it possible, that one person may communicate a sensation to another person? He must give his sensation an objective aspect, he must translate it, so to speak, into its objective form, in other words, he must express it by an equivalent of motion. And whereas sensation as a subjective phenomenon is not directly transmissible, it becomes so indirectly in form of motion which constitutes its objective equivalent.

In connection with the foregoing more general considerations we may now try to elucidate in detail one of the most important sensory phenomena, namely, visual perception.

Visual perception may be defined as the definite sensation caused in an individual by communicating to him a definite mode of motion or vibration, known as light. We know, that the vibrations produced by an electric current in the wire of a glow-lamp are realized by us as sensation of light. Now let us prove, that the parenchymes of those nerve cells, engaged in the sensory act of seeing, do at the same time perform a motor act by originating vibrations commensurate to those of light.

To that purpose we may derive much aid by scrutinizing a trivial experiment. If one, after having looked for a while at an evenly colored object, for instance, a red disc, suddenly directs his view toward a white wall, he will perceive an image of the disc on the wall; but instead of seeing it in the original red color, the image will present itself in the complementary color "green." It may be remembered here that colors are called complementary to each other, if on addition they compose the color "white." Let white be represented by vibrations of 1000 velocity in a definite unit of time; red, as a fraction of white, be represented, arbitrarily, by vibrations of 100 velocity in the same unit; green, will then, as the complementary color to red, have to be symbolized as vibrations of 900 velocity. While looking at the red disc, the intracellular vibrations of the centers of sight in the brain adjust their vibrations to a velocity of 100, and the sensation "red" is realized; if now the red disc be suddenly supplanted by a white surface, from which emanate vibrations of 1000 velocity, the intracellular vibrations, which were up to that time of 100 velocity, have to be increased by 900 in order to adjust themselves to the vibrations of 1000 coming from the white surface. The addi-

tional intracellular vibrations of 900 velocity are the motor equivalent of the sensation "green." Thus is given a comprehensive explanation of the production of complementary colors in after-images, although this conception of the phenomenon deviates materially from the theories in vogue at the present time, and besides this experiment furnishes an example of a motor act during a sensation.

But there is a more unique method of proving the coexistence of intracellular motion during the act of visual perception. With the aid of a suitable apparatus, which will be minutely described in a later article, we are enabled to take photographs of emanations coming from the eye during the act of visual perception.

It is very probable that vibrations emanate from all nerve-centers at all times, that they are most active during consciousness, and that those from the organs of sight are similar to light-vibrations. During visual perception the rays entering the eye from a source of light disturb the equilibrium of those nerve-vibrations emanating from the optic nerves, consequently, they must adjust their mode in order to balance the mode of motion impinging from without. The increased efflux of energy which restores and maintains the equilibrium between afferent light-vibrations and efferent nerve-vibrations, is subjectively appreciated as a sensation of sight, whereas, objectively, it constitutes a mere motor phenomenon. The outflow of nerve-energy over the optic nerve has an analagon in the continuous efflux of nerve-energy which maintains the tonus of a muscle, and which may, during a definite sensation, be exaggerated to such an extent as to produce forcible contractions of the muscle.

Thus far we have only spoken of that kind of visual phenomena which have an adequate cause outside of the organism, and it seems proper now to mention visual phenomena devoid of an external cause and known as visual hallucinations. Since visual percepts are capable of exciting the emotional sphere of the mind, it is easy to understand that the reverse should be true, and that emotions may evoke their equivalents in the visual regions of the brain; the visions thus produced are not percepts, but hallucinations. It is not a coincident that hallucinations occur exclusively during a state of increased subject-consciouness and abate object-

consciousness of the individual at a time when nervous emanations from within partially or completely overbalance all impressions from without, so that perception, or the adjustment of internal relations to external relations is no longer possible. Then the overpowering subjective feeling pours out streams of nerve energy, and while they traverse the regions of the brain, which in the normal state of mentality pertain to vision, they are formed into sensations of sight. The only difference between visual perceptions and visual hallucination is, that during the former, those nerve-vibrations from the brain are adjusted to light-vibrations from without, whereas, during the latter, the vibrations produced by the nervous system are so powerful that they overbalance the rays of light from the outer world.

Returning to Spencer's definition of Life, which we interpreted, after some elaboration, as the continuous adjustment of subjective relations, or sensation, to objective relations, or motion, we behold the principles of life everywhere, since every adjustment or reaction comprises in itself the elements of sensation, or that inherent power of discrimination, which we meet in the highest forms of life as individual consciousness. Motion reveals itself merely as the means by which nature expresses and communicates sensation; sensation is the soul of all existence, motion is the image; and if motion prevails throughout the universe, it only proves that sensation is omnipresent.

TYPES OF ALCOHOLIC INSANITY, WITH ANALYSIS OF CASES.[1]

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In the preparation of this paper, from the Danvers Insane Hospital records available for such study, an attempt has been made to outline the clinical course, to note prominent symptoms of the alcoholic psychoses, and to determine from the study of cases if heredity, the occurrence of any characteristic symptoms, or the kind of liquor used bear any relation to the prognosis; if the manner of drinking, or the form of liquor influences the psychosis; if delirium tremens bears any relation to the later development of other alcoholic psychoses, or alcoholic hallucinosis to the persecutory delusions of alcoholic delusional insanity, and finally to estimate the percentage of cases of alcoholic hallucinosis recovering without appreciable defect.

During the five years ending with the fall of 1903, 1129 male patients were admitted to the Danvers Insane Hospital. After excluding the dipsomaniacs, who exhibited no active psychical symptoms, and a few doubtful cases where other psychoses were evidently modified by habits of inebriety, there remained 148 cases of the various forms of alcoholic insanity, or 13.1 per cent of the total admissions for the period named.

The cases have been grouped under the following subdivisions:

1. *Delirium Tremens:* This diagnosis being reserved solely for the cases displaying disturbance of consciousness, disorientation, confusion and tremor, with active hallucinosis.

2. *Alcoholic Hallucinosis:* (a) Acute, (b) sub-acute. Using the term of Wernicke and Bonhoeffer, the diagnosis in these cases is made upon the slight impairment of consciousness, active hal-

[1] Read before the Boston Society of Psychiatry and Neurology, May, 1904.

lucinations, auditory, visual, olfactory and tactile, and delusions usually of the persecutory and apprehensive types, based upon the hallucinations, with little memory disturbance.

3. *Alcoholic Delusional Insanity:* or what may be called alcoholic paranoia, characterized by the slow formation of paranoioid delusions, upon the basis of chronic alcoholism.

4. *Alcoholic Dementia:* These cases show irritability impaired memory, emotional and intellectual deterioration without prominence of hallucinations or delusions.

DELIRIUM TREMENS.

In making the diagnosis between delirium tremens and alcoholic hallucinosis, it is essential to have a full knowledge of the case from the onset of the disease and even then there are intermediate cases, which make the separation difficult. But the diagnosis has been made upon the lines mentioned, as the cases abstracted will show.

CASE I.—George P. Born in Massachusetts. Aged 29. Single. Laborer. No heredity. He had drunk ale and distilled liquors for eleven years and had been often intoxicated, having been twice arrested for that offence. He had worked in a brewery for six months before coming to the hospital. This was his first attack. He was arrested by the police and brought to the hospital at once. On admission his tongue was heavily coated and he showed a pronounced muscular tremor. His tendon reflexes were active. Pulse-rate 110. He was completely disoriented; thought he was in the Swasey Building, Haverhill,—had no idea of time. There were active visual and auditory hallucinations, the former predominating. He saw lions, ghosts, Indians, green snakes and birds in his room. He would hop across the room to catch some animal, shouting,—"Now, I've got him. Oh! they are tacked down," (after failure to lift his catch). He pointed to the wall, saying: "See that little sheeny with his sword." He dodged a sword-thrust and then added: "He has a double-headed pipe in a brown case. Now see him poking my sister's baby carriage with his sword. There is a wooden horse's head trying to eat a dog. Now he is eating a horse-blanket and the dog has got away. See that red-bird with a red ribbon around his neck. What is all this wire whirling around me? You've got a little fine blue wire on your left ear and you've got eight watch-chains in your vest, one above the other." He heard voices calling him names. He showed but slight apprehensiveness and would answer questions about his past when his attention could be held for a moment. There was no attempt to explain the hallucinatory phenomena. He was almost constantly in motion in reaction to his hallucinations, for four days refusing food, but drinking liquids freely. He

obtained less than six hours' sleep during this period. On the fifth day, he slept 15 hours without hypnotics, and from that time was oriented, and had clear insight. He had a dreamy recollection of recent experiences, but could not give the details of actual occurrences. He remained in the hospital for three months. He was discharged, recovered, and two years later was reported to be abstinent, working steadily. He had no further mental disturbance.

Case II.—Herbert G. Born in Massachusetts. Aged 45. Druggist. Married. Average mental capacity. No heredity. First attack. For twenty years he had drunk distilled liquors freely and for many months had been drinking excessively, sometimes using a quart of whiskey daily, but rarely being intoxicated. He was irritable and talked to himself for a few days before the onset of the delirium. Suddenly he became delirious and was kept at home for three weeks, and was then brought to the hospital. He was poorly nourished. Thick brown coating on tongue; sordes on teeth and lips. Temperature 98.6.° Pulse 118, small volume. Peripheral circulation sluggish. There was general tremor and considerable incoordination in the muscular movements. The pupils reacted to light and accommodation. The tendon reflexes were active. No apparent disturbance of sensation or tenderness of nerve trunks. Entirely disoriented for time, place and persons. Able to give name, age and occupation, but little more. Speech thick and almost unintelligible. There were active visual hallucinations. He tried to pick imaginary objects from the bed, floor and his person; and went through the motions of winding strings. There was constant restlessness and feeble groping motor activity, allayed for a time by therapeutic measures. He soiled his bedding and person for several weeks. He became very feeble, requiring saline solution and strychnine stimulation, and for a month after his admission remained in a low, muttering delirium, gaining in strength during the latter part, when he would get out of bed and crawl around the floor; try to climb out of the window and grope about for imaginary objects. For the next three weeks, he made a gradual improvement and at the end of two months, was oriented, had good insight and a dreamy, confused recollection of seeing animals, people in strange garb, of killing a woman by throwing a ship at her, and similar absurd ideas, but was unable to give any details of actual experiences. He was discharged, recovered, after two months of hospital residence. When seen four months later, he appeared to be perfectly well. A year later, his relatives report that he is better than he has been for years, conducting a drug-store successfully. He shows no changes in character or disposition and has used no liquor since his discharge.

In case I, we had a mild attack of delirium tremens with slight somatic disturbance, complete disorientation, active visual and less prominent auditory hallucinations. There was constant motor activity and slight apprehensiveness. The attention could be

held with difficulty, but the patient was able to give correct replies to questions relating to remote events. There was a complete subsidence of mental symptoms following the first natural sleep; convalescence was rapid.

In case II there was a history of prolonged and excessive use of distilled liquors, with the somatic symptoms of a severe delirium, complete disorientation, inability to converse or answer questions intelligently, muttering speech and feeble motor restlessness. The condition lasted for weeks with great physical prostration and was followed by gradual convalescence.

These two cases represent the extremes of this group.

There were forty-one cases of delirium tremens, 27.7 per cent of the alcoholic cases. This low percentage is due to the fact that many cases of delirium tremens never reach the hospitals, while the graver forms of alcoholic insanity more generally require commitment. This is shown by the history given in many cases, of the latter groups, of antecedent attacks of delirium, not requiring hospital restraint.

These 41 cases showed no special features. In every instance there was disorientation, with vivid visual and auditory hallucinations and illusions, tremor and various somatic symptoms. It was the first attack in 32 cases, the second in 3, the third in 2, in 4, the history was unreliable. Thirty-nine patients were discharged as " recovered "; one " much improved," after remaining in the hospital only a few days; and one died from pneumonia. Two of the three patients seen first in the second attack, and one in the third, were admitted later, suffering from alcoholic hallucinosis, and the other seen first in the third attack died about one year after his discharge, during a fourth attack.

The average age of all delirium tremens cases at the time of the first attack, was 33.9 years.

The patients were usually convalescent by the end of the first ten days after admission, but the average duration of hospital residence was 3.1 months.

So far as can be estimated from these cases, the prognosis in uncomplicated cases of a first attack is good, there having been no development of any more serious disturbance that could be connected with this attack.

ALCOHOLIC HALLUCINOSIS.

(a). Acute.

(b). Subacute.

(a). Acute alcoholic hallucinosis.—Under the diagnosis of acute alcoholic hallucinosis, the abstracts of some cases typical of the mild and severe forms of that group are presented.

CASE III.—Louis B. Born in Poland. Age 39. Operator. Married. Heredity denied. First attack. Has used liquor moderately since an early age and within the past three years has frequently been intoxicated, having been arrested six times in the past year for that offence. He gave a history of having worked irregularly and of having drunk to excess up to the day before his commitment, when he suddenly heard voices calling him vile names and making threats. He went about the streets seeking to escape from men whom he fancied were following him, and finally locked himself in his room where he was arrested on the complaint of the landlord and taken to the station-house, reaching the hospital on the following day. On admission, he showed some fine general tremor. Temperature normal; reflexes unchanged. He was oriented, gave a good history of his life with a fairly good account of recent experiences. He heard detectives trying to get into his window and talking outside the door; frightful suggestions were made and he showed great apprehensiveness, based entirely upon auditory hallucinations. He improved rapidly. Only broken sleep was obtained under hypnotics for the first two nights. Voices were heard with decreasing reaction for three days. After that time the patient had good insight and even joked about his trouble. No intellectual deterioration was found during a hospital residence of two months. Discharged, "recovered." Two weeks later he was seen intoxicated. The subsequent course of the case was not traced.

CASE IV.—Frank M. Born in Canada. Age 33. Single. Morocco dresser. Heredity denied. Below the average in intelligence. No previous attacks. Had been a daily consumer of whiskey for about 15 years. Frequently drunk. For several days before admission, while at his work, and at night he had heard voices, threatening and talking about him in an abusive manner. At night he saw "images of men" and "visions." He fancied the men were trying to injure him. He became very apprehensive and was brought to the hospital. On admission the temperature was normal. He was oriented and there was no disturbance of consciousness. He gave a good history of his life with minute details of recent events. He had active auditory hallucinations during the first week after his admission. The same voices he had heard before admission annoyed him at night by saying: "You'll be crazy all your life." "Take a razor and cut yourself." "You fool, fool, fool, you'll be arrested." During the first day in the hospital, he saw men around him of whom he was afraid. His apprehensiveness quickly disappeared under assurances from the at-

tendants and at the end of the second day, he had partial insight, and said of himself,—"Oh, my head is turned upside down, brain is loose, and it goes around like a wheel. It feels as if there were wires in it." There was no elaboration of apprehensive ideas and hallucinosis entirely disappeared at the end of the first week, leaving the patient with clear insight. Discharged, recovered, at the end of three months of hospital residence. Remained well and used no liquor during the next year.

CASE V.—Greenleaf T. Born in Massachusetts. 59 years old. Average ability. Musical temperament. Married. Plumber. Paternal grandfather insane. Father died of obscure cerebral trouble at 55. Mother died at 30 of pulmonary tuberculosis. Two sisters are "peculiar." Had used distilled liquors moderately for thirty-five years. For several years prior to commitment he had taken from 4 to 6 drinks daily, but never drank to intoxication. First attack. For some time before commitment he had been fault-finding, irritable and sleepless, and for about one month had heard voices threatening and talking about him. He purchased a pistol to protect himself from fancied danger and fired several shots about the house at night. He had given up work a few days before commitment and rapidly became more apprehensive and excitable. Talked of suicide. The night before commitment, he was walking about his house carrying a revolver in his hand, apprehensive and quarrelsome when restrained, though perfectly oriented. On admission to the hospital he was found to be of good physique. Temperature 99.4° F. General muscular tremor. Pupillary reactions normal. Knee-jerks much exaggerated, slight ankle-clonus. Other reflexes active. Sensations unimpaired. He was oriented for time and place, and was able to give a complete history of his life and an account of recent events. He had active auditory and visual hallucinations, the former being more prominent. Was extremely agitated and apprehensive much of the time. During the examination he started to leave the room, saying with every appearance of alarm: "Don't you hear them talking about me? Hear that fellow say: 'They have got T. now.' If you hadn't come just as you did, I'd been a dead man sure, and don't you forget it." He heard voices accusing him of incest and other crimes, or telling him his wife had deserted him; that members of his family were sick or dead. During the first night at the hospital, he had occasional visual disturbances, once stating that he saw men "slashed and killed," or that he saw men "trying to get him." Only at this time, were visual hallucinations detected. There was some insight. He said: "I don't know what is the matter with me, everything is all mixed. I can't think." There was intense reaction to hallucinosis shown by his intermittent fear and agitation and the apprehensive, persecutory ideas based upon hallucinations. He fancied himself the victim of a conspiracy, believed he was going to be killed, and begged to be given his liberty, saying,—"I want to go home. I don't want to stay here. These fellows act very hard and will kill me just as sure as the world. If I have to stay here, I'm a gone sucker. Let me go home and I won't say a word. Now, how would you feel if

you came in and found me dead?" For six weeks after admission, he had hallucinations and showed similar reactions. Gradually he began to sleep better, his appetite improved and the apprehensiveness became less marked. The auditory hallucinations became less terrifying. At no time was there complete disorientation, though for the first ten days he confused dates and persons, and later his memory of this period was indistinct, many of the events seeming to have a dream-like character. On one occasion, he tried to break out of his window to escape from his fancied peril; on another he tried to leave by climbing through a transom.

The return of complete insight and the correction of the apprehensive ideas followed quickly the cessation of hallucinosis and he was discharged, as recovered, at the end of ten weeks' hospital residence. A year later, his relatives reported that he had used no liquor since his discharge, had resumed his duties and appeared perfectly well.

Case VI.—Frank C. Age 37. Born in Massachusetts. Operative. Single. Paternal grandfather died of "softening of the brain." His father had been intemperate, and died of apoplexy at 64; had shown mental weakness for some years before his death. Two brothers were intemperate, one having shot himself fatally while suffering from the effects of alcoholic indulgence. For over twenty years, the patient had been a constant user of distilled liquors and beer. He had been repeatedly arrested and fined for drunkenness and eighteen months before his admission he had suffered from a disturbance diagnosed by the attending physician as delirium tremens. He made a prompt recovery and was well in the interval, during which time he drank excessively. A few days before his commitment he became nervous, and at first had occasional visual hallucinations which he corrected and remained at his work. In two or three days, he began to think that his fellow workmen were talking about him, threatening to make him a pauper, and to inflict bodily injury upon him. He became very apprehensive, secured a revolver and threatened to commit suicide; he then applied to the police for aid and was brought to the hospital on the following day. On admission, he was perfectly oriented, had active hallucinations, and apprehensive, persecutory ideas based on his hallucinations. He said the early visual disturbance was due to drinking, but that for some reason his shopmates had conspired to injure him. He said that he heard them talking about him constantly; that they had followed him to the hospital, and that he heard them outside his door and window. He tried to hide in the room fearing he would be shot. He heard them saying he was to be sent to an inebriates' home for life; that he ought to be shot and applying abusive epithets to him. His consciousness was clear and his memory fairly good even for recent events. There was slight general tremor. Reflexes normal. There was no further visual disturbance. The auditory hallucinations persisted for nearly a month, but there was little reaction to them after the first two weeks, and at the end of a month they had disappeared, and he had good insight. There was a slow, steady improvement from the first. He was discharged, "recovered,"

three months after admission. Two years later, his relatives reported that he had been well and working since his discharge, but had been drinking excessively for a few months and recommitment was probable.

Cases III and IV are fair representations of the mildest form of disturbance in this group. The former having shown an acute onset of auditory hallucinations and apprehensiveness, but with perfect orientation. Disappearance of symptoms and with good insight at the end of one week.

Case IV shows a more gradual onset. For several days faint voices were heard; they became more substantial, threatening and abusive remarks became definite and apprehensiveness followed. The patient began to have visions; he saw dim images and had many apprehensive ideas based entirely upon hallucinations, which disappeared in about three weeks, leaving him with clear insight. Orientation and memory were unimpaired during the attack.

Case V had a longer onset with gradually increasing auditory hallucinosis, reacted to by fear and attempts at self-protection and threats of suicide. Visual hallucinations played a minor part, being observed for only a few days; there was little insight and the patient was partially disoriented at the height of his psychosis. Persecutory and apprehensive ideas were entirely based on hallucinations and rapid, complete convalescence followed their disappearance.

Case VI is one of a second attack, with heredity of intemperance and insanity, and presented about the same symptoms as case V, with the exception that the persecutory and apprehensive ideas were more marked with a slight tendency to elaboration and there was less hallucinatory confusion.

The milder cases bear considerable resemblance to delirium tremens. The more severe forms are separated from the subacute group by an arbitrary division.

In the 33 patients observed, 16 were of foreign, 17 of native birth. Twenty-one were married, 12 single. Average age 37. Only four were above the grade of laborers or tradesmen. In 14 cases, it was the first attack; twelve had had one previous attack of delirium tremens or hallucinosis, and seven had had two or more. Eight preferred ale and beer, but all used distilled liquors. Twelve were considered to show varying degrees of congenital deficiency.

In eight cases, heredity could be excluded. There was distinct insane heredity in nine cases, a number which would probably have been increased had reliable histories been obtainable from all. In eight of these nine patients there had been previous attacks. They invariably presented severe symptoms, and their subsequent history, with one exception, shows a return to drinking habits and more or less mental disturbance.

Of the entire number, ten made definite suicidal attempts and two suicidal threats, as a consequence of active hallucinations. No characteristic neurological symptoms were observed. In 7 cases, the tendon reflexes were increased; in 7 they were diminished. The knee-jerks were absent in 2 cases. Ankle clonus was present in 1 case. Unequal pupils, with impaired light reaction in 6 cases. In 24, there was a varying degree of muscular tremor.

As regards the mental symptoms, 9 patients had auditory hallucinations alone; 22 had auditory and visual hallucinations with prominence of the former, and in 2 olfactory hallucinations were seen in addition. The duration of the hallucinosis varied from a few days to several months. The reaction varied from slight apprehensiveness to distinct persecutory ideas, definitely related to the hallucinosis. There was imperfect insight in all the cases and in the more severe there was hallucinatory confusion with some impairment of memory for the period.

One patient died at the hospital; all the others were discharged, after an average hospital residence of 3½ months, as recovered or much improved. Less than 25 per cent. of the patients, traced after discharge, have remained temperate and able to perform their duties successfully. Several have been reported as drinking excessively and showing changes in character and disposition, and all of these have had two or more attacks of alcoholic mental disturbance.

(b). Subacute alcoholic hallucinosis.—The course in subacute hallucinosis is prolonged, frequently marked by relapses; i. e., there are several periods of active hallucinosis and a comparatively clear mental state in the interval. Olfactory and tactile hallucinations are common, and there is more disturbance of judgment, resulting in greater prominence of persecutory, somatic and apprehensive ideas, based on the hallucinations.

The following abstracts are representatives of the group:

CASE VII.—Stafford W. Colored. Born in Virginia. Aged 54. Laborer. Married. Heredity unknown. Below the average in mental capacity. For over 25 years he had used distilled liquors and beer almost daily. For several years before commitment he had been employed around barrooms, drinking daily and often getting intoxicated. There was no history of a distinct previous attack, but for three years he had been irritable and suspicious when drunk and, as stated by himself and members of his family had had occasional fleeting auditory and visual hallucinations, often reacting to them by acts or threats of violence, or by temporary apprehensiveness. For several months before admission to the hospital, the hallucinations had been more or less constant, and for two weeks he had been unable to do his usual work, and was sleepless; the appetite was poor; he had had active hallucinations and apprehensive and persecutory delusions based on hallucinations. He finally threatened to kill members of his family and others whom he heard talking about him and was committed. On admission, he was poorly nourished. Neurological examination negative. There was mitral regurgitation and the heart's action was irregular. Pulse 90. History of typhoid fever and rheumatism in early life. He was oriented; the consciousness was clear and there was practically no memory defect. In describing his experiences he said,—"I don't seem to know what is the matter. I think all my family have been murdered. To-day, I heard my grandchildren call me and spirits told me they were dead. For three years, God, man or the devil has got the upper hand of me." In the midst of a conversation, he would pause and address an imaginary character, saying,—"Now, I'm talking with the doctor, you keep still." He had seen "spirits" in the shape of "little devils" jumping around his room, calling him abusive names, "aggravating, tormenting and poking fun at me." Men hovered about him for the same purpose. Disagreeable odors were produced. Voices continually threatened and abused him. Once only he gave evidence of tactile disturbance, complaining that he had been shot full of needles. At first he was very apprehensive, but within a few weeks fear was rarely observed, though the auditory hallucinations continued with decreasing intensity for about five months. The visual and olfactory disturbances were not noted after the first few weeks, after which he reacted but little to hallucinations. At times he was rather surly and evasive when questioned; or again he would make joking remarks about his troubles and display increasing insight. About five months after admission to the hospital, he had corrected his ideas. He was assigned to some routine work and was amiable, and conversed well, but was rather listless, taking no interest in his future, and expressing no wish to leave the hospital, though his family were able to give him a home. At no time was there disturbance of orientation, consciousness or pronounced intellectual defect. He was discharged as recovered after 13 months of hospital residence. Two years later his wife reported that he had worked steadily, used no liquor in the interval and had displayed no evidence of active mental disturbance.

CASE VIII.—Frederick M. Born in N. H. Aged 44. Married. Driver. Both paternal and maternal uncles were intemperate, and his father was a drunkard. The patient had drunk whiskey and ale almost daily for 23 years, with the exception of two periods of about four years each when he was abstinent. He had been frequently intoxicated, and had been arrested several times. He had had one attack of delirium tremens ten years previously and had taken the "gold cure" about five years before this attack, after which he had used no alcohol until one year ago. For several months before commitment, however, he had been drinking to excess. He had worked up to the day before his arrest, and had returned to his home that night under the influence of liquor. During the night, he became terrified by hallucinations, auditory and visual. He opened his window and called for help and the police, who took him to the station-house where he remained for 36 hours, in a state of active hallucinosis, but oriented and able to give a full account of all his experiences.

On admission he was found to be a man of powerful physique. The heart and lungs were negative. Temperature normal; pulse 80. There was a slight general tremor, no ataxia. Knee-jerks diminished. He was perfectly oriented and remained so throughout. There was no disturbance of consciousness or memory defect. He saw men about him with revolvers and once a sword was thrust at him. He constantly heard talk about his mother being robbed and murdered by the police, who were trying to cover up the crime by having him placed in the hospital. He heard that he was to be killed and begged the physician to protect him, promising a money reward if he were saved. He had also many similar apprehensive and persecutory ideas based on hallucinations. This state lasted for ten days, the symptoms gradually abating. On the tenth day at the hospital, he approached the physician in a frank smiling manner and said,—"I have just come to myself. I've been thinking that someone was trying to teach me some sort of an organization, but I've been making a fool of myself." For three days he seemed to be in a normal mental condition but suddenly became moody, inactive, attacked a patient whom he fancied was talking about him, accused an attendant of saying that he was suffering from syphilis, heard men lying in wait for him around the corners and showed almost constant apprehensiveness. For the next five months there was active auditory hallucinosis to which he frequently reacted by acts of violence. He was surly and evasive for two months, later becoming more amiable and talking about his disturbance. He heard voices at all times; they came from the air, out of the floor as passers-by lifted their feet; passing trains whistled his name repeatedly. He heard voices telling the cards he held to his opponent. He saw faces staring at him from the paper he read, from the walls and from the sky. Aside from the usual reaction to these phenomena he showed some tendency to elaborate delusions. He fancied someone in Lynn was responsible for his trouble; they were trying to initiate him into some order. On one occasion, he fancied he was in authority and gave orders about the hospital, threatening to kill the doctors

if he was not obeyed. The hallucinosis gradually became less active and insight became better, but he had not corrected his ideas and had occasional auditory hallucinations at the end of five months of hospital residence, when he was transferred to another hospital, from which he was discharged against the advice of the physicians, three months later, having shown some slight improvement. His subsequent history is not obtainable.

CASE IX.—Martin C. Born in Mass. Aged 23. Laborer. Single. Below the average in mental capacity. Had several insane relatives on the paternal side. Father intemperate. The patient had used distilled liquors and beer freely for eight years, and had frequently been drunk during the past five years. He had had an attack possibly of delirium tremens six weeks before the onset of the present psychosis; had worked during the interval, drinking heavily and often being intoxicated. Ten days before admission, he began to imagine people were following him about the streets. He gave up work; his appetite became poor and he was sleepless and apprehensive. He was arrested for throwing a brick through a neighbor's window and committed to the hospital. On admission, the physical examination was negative, excepting that there was fine general tremor and the tendon reflexes were exaggerated. He was oriented and had a good memory for recent and remote events both on admission and throughout his stay at the hospital. He had active auditory, visual and tactile hallucinations. He saw people on the wall "working X-rays and the bioscope on me" and added,—"they have been doing this for two weeks and they have made my kidneys weak, burned my flesh, and they can do it right under the bed clothes, and it burns me." He showed apprehensive and persecutory ideas, fancying that his tormentors had followed him to the hospital to continue their abuse. At the end of two weeks, he was sleeping well, and was less excitable and apprehensive, but still had active hallucinations, complaining that he was "all knocked out by the X-rays and bioscope." He said that he could see people at a distance operating the machine on him, and heard voices, but tactile disturbance was not noted.

Six weeks after commitment, he wrote,—"Mrs. S. and Kitty and her son, Charlie, are working the bioscope and X-rays combined on me since I came up here. They are talking how near they came to killing you when you were sick, they put it all over you. They were putting it in my eyes when I was sleeping in my bed, and I discovered them working the X-rays into the bioscope. I turned right over on my belly and could see right into the room where they were sitting down. They had rods about four feet long, reaching up to the bioscope, working the X-rays onto the pillow of the bed. I heard them talking about how they fooled your brother, Willie. They said they killed Dennie with the X-rays and they had it in Willie the day he was burned." This narrative was continued to some length, showing a tendency to elaborate delusions. He rarely showed any emotional excitement during the remainder of stay in the hospital, beyond a slight irritability when his statements were questioned. For several months, he was inactive, complained of his auditory and visual

hallucinations, but showed little reaction to them. He showed no disorder in his conduct and was neat in the care of his person. He gradually showed increasing interest in his surroundings, and began to work. The hallucinations gradually faded out and 18 months after admission he appeared to have good insight, and entirely corrected his former ideas. His memory was good. He conversed well and had a fair knowledge of current events. He remained at the hospital eight months longer with no more active mental disturbance. He was always smiling and pleasant, but rather indifferent and probably displayed some emotional deterioration. Over a year later, his relatives report that he has used no liquor since his discharge, is industrious and seems to be well.

Case X.—Henry W. Born in Ireland. Aged 28. Laborer. Single. History as to heredity and previous attacks unreliable. He had been a steady user of distilled liquors and beer for about ten years. He had often been intoxicated, and for several weeks before admission had been on a protracted debauch. Finally he applied to the police for aid, and was committed as insane in April, 1903. The note on entrance says that the patient was a powerful, well nourished man; slight tremor was apparent but the physical examination was otherwise negative. He was fairly well oriented for time, place and persons. There was a slight memory disturbance for a period of a few days before commitment, though he could tell where he had been and much of what he had done. He gave a good history of his previous life. Had active visual, auditory and olfactory hallucinations. For several days he had seen and heard devils. They tormented and talked about him abusively. He heard them say that his soul ought to be let out and while in the police station he tried to cut his throat with a sharp stone, and banged his head against the wall in attempts to commit suicide. The auditory hallucinations consisted of abuse, and remarks about him; such as,—"He has been a good fellow, but he was foolish and led astray." He could smell brimstone as the devils approached. He showed considerable apprehensiveness, had no insight and could not account for his experiences. The auditory and visual disturbance continued with gradual abatement for 20 days, when they apparently ceased entirely and patient had good insight as to the character and cause of his trouble. For nearly a month, he seemed well. Then the auditory hallucinations suddenly returned, but there was no visual disturbance. Voices talked to and about him more or less constantly, and he was irritable and apprehensive for about a week. He was perfectly oriented during this period. He wrote a letter to a priest, saying that he had broken his pledge, had gotten into trouble and heard that he was going to be driven out of the church in consequence. Then for six weeks he appeared well. He recognized that his fears had been imaginary and stated that he was ashamed of his conduct, which he remembered clearly. After five weeks of an apparently normal condition he again began to have hallucinations. At times he was unruly and surly in his manner, but always oriented and had a good memory. The disturbance lasted for several months. At

the time of writing, he is in the hospital and for some time has talked about his trouble evasively. He denies having any hallucinations at present. He is oriented. There is some memory defect, but he can recall most of his hospital experiences. He thinks he came to the hospital as a result of hard drinking, and adds,—"I've been pretty well wound up in here. I was ashamed the way I acted, after I came to myself again." He is quiet and orderly, but rather indifferent to his surroundings and seems to show considerable emotional deterioration. He does some work about the grounds and follows the daily routine without expressing any desire for change of surroundings.

Case XI.—John M. Born in Ireland. Aged 42. Liquor dealer. Married. Above the average in ability. No heredity or previous attacks. For over twenty years he had been in the habit of drinking all kinds of alcoholic beverages. Drank daily but had rarely been intoxicated. For over a year before admission, he had appeared peculiar, was suspicious and fault-finding. For seven months he had had hallucinations at intervals. He thought people were following him about the streets. He heard that he was going to be driven out of business; that his wife was in league with others to force him into bankruptcy. One night while preparing for bed he had tactile hallucinations. He imagined that his wife turned an electric current on him from a concealed battery. He got an axe and tried to find and demolish the battery, and called the police to the house to aid him in his search. He was taken to the police-station for twenty-four hours and then removed by relatives, his excitement having subsided. He returned to his house, accused his wife of using a battery on him, got his effects and went to a boarding-house for some months, but continued to provide for his wife and children. Of what happened during the next four months we have no accurate history. He had been working as a drummer for a liquor house and had aroused no suspicions among his associates as to his mental condition. Then he returned to his home, depressed and had active hallucinations for several days. He heard voices, fancied he was drugged and was suspicious of those about him. He was taken to a private hospital, where he remained only a few days, with some improvement. He absconded and returned to his home, gave up business, and lived quietly at home for three months. During this period he did not show much interest in business matters, but displayed good judgment in looking after some property he owned. He was suspicious of his wife; occasionally referred to his previous hallucinations, and did not fully correct his ideas concerning them. His wife noticed that he was unusually inactive and sometimes depressed. Just before admission to the hospital he grew worse, became very suspicious of his wife, heard voices and fancied he had been drugged. He cut his throat with a razor and was taken to a general hospital and on the tenth day was committed to Danvers. He was poorly nourished, being twenty pounds under weight. The wound of the larynx had healed. There was slight aphonia. Some tremor. Tendon reflexes exaggerated. Physical examination otherwise negative. He was

quiet, self-possessed, and conversed readily; perfectly oriented for time, place and persons. There was no evidence of hallucinations at this time, though he fully described those above mentioned, and believed in them. He could not account for them in any way, and did not try to explain why his family and others should have any but the kindliest feeling towards him. His memory was good for everything except the suicidal attempt. He claimed that his wife had drugged him that evening, and that he remembered nothing until the officers came to take him to the hospital. He reacted normally to his surroundings, but showed slight depression when talking of his troubles. During the next five months, he gained 30 lbs. in weight, and showed no evidence of hallucinations. He was amiable to all, asserting that his affection for his family was as strong as ever, though he could not explain his former treatment. During this time a guardian was appointed and the court allowed his wife a monthly sum for maintenance. He insisted that this should be increased so that there need be no change in her living arrangements. He went over his accounts and showed good judgment in his suggestions about disposing of some property. He never had clear insight, did not correct his ideas and seemed rather indifferent, accepting his confinement as a matter of course and showing no active interest in his own welfare. Auditory, visual and tactile hallucinations became suddenly active for a period of ten days with intense reaction to them; consciousness and orientation were retained. He felt something "like a shell" strike him in the mouth and said,—"It went all over my left side and tied me up so I could not move, and I thought surely I was going to die." He attributed this to his wife's actions, and likened it to the "shock" received at home. He heard his wife, acquaintances, doctors, priests and others talking to and about him. He accused the physicians of turning electrical currents on him through the radiators in his room. He saw his daughter come into the room at night. She told him that he was to be killed. He saw strange men making for him. He would answer the voices and was much excited at intervals. He refused food, affirming that he had been told it was poisoned. He slept irregularly, being alternately depressed and excited. The hallucinations were constant. He spoke of the present disturbance as the same as the one previously experienced.

The outbreak subsided rapidly, and for four months his condition was much as before, though he was somewhat more indifferent and inactive. Then, there was another short period during which similar hallucinations and reactions were noted. At the time of writing, the hallucinations are slowly fading out from the last attack. There is little, if any, memory impairment for the recent periods of active hallucinosis.

In Case VII, we see a prolonged onset, the hallucinations gradually taking on definite shape, reacted to by violence, apprehensive and persecutory delusions, with no elaboration but some attempt at explanation. The auditory hallucinations were most

prominent; the tactile and olfactory disturbances transient. Memory and consciousness were not affected.

Case VIII was of a sudden onset, with remission in a few days, during which the patient seemed to have good insight, and to have corrected his ideas. The hallucinosis, auditory and visual, was the prominent feature of his case, accompanied by the common reaction, with some attempt at explanation and formation of an ill-defined delusion system, which was largely abandoned before the hallucinations disappeared.

Case IX is marked by a slowly developing hallucinosis, transient olfactory and tactile deceptions, auditory and visual hallucinations being vivid and prolonged. Consciousness was clear throughout and there was but little memory defect. The delusions were entirely based upon the hallucinations, which continued long after the patient showed no active reaction to them.

In cases X and XI, the former of sudden onset after a protracted debauch, the latter coming on gradually after many years of daily drinking, we see as a prominent feature the remissions. In both, there have been numerous outbreaks of active hallucinosis. There was but little delusion system in either, and in the intervals, partial insight and correction of ideas were noted.

In the 25 cases of this group, the average age at onset of the attack was 37 years. Eight patients were of foreign, seventeen of native birth. Thirteen were single, twelve married. Twenty-two were laborers or tradesmen.

As to the form of liquor used, only three preferred malt to distilled liquors, and all used more or less of the latter. Eight were steady, daily drinkers, rarely intoxicated; seventeen drank more irregularly and among them drunkenness was common. The duration of drinking habits varied from eight to over twenty-five years. Eighteen of the number would have to be regarded as below the average in mental capacity.

It was the first attack in ten cases. In ten, there had been one previous attack of delirium tremens or hallucinosis, from three months to ten years previously. Two patients had had two, and two three previous attacks. In one the previous history was not known. Six patients made definite suicidal attempts, and four made suicidal threats in reaction to active hallucinosis.

Auditory hallucinations alone were seen in three cases; auditory

and visual in thirteen, the former predominating; auditory, visual, olfactory and tactile in three; auditory, visual and tactile in five; auditory, visual and olfactory in one.

The delusions were more extensive and of much longer duration than in the former group, but they were almost exclusively based on the hallucinations with little elaboration. Expansive ideas were noted in several cases, and the patients usually explained all their hallucinatory disturbance. In the later stages of the disease, there was usually a blunting of the sensibilities with very little emotional reaction to the various delusions, even while hallucinations were active.

There were no distinctive neurological symptoms. There were two cases of alcoholic polyneuritis with the usual symptoms. There were four cases presenting some appearance of paresis, irregular, sluggish pupils, disturbance of reflexes and tremor, with a positive history of syphilis in three. All four have been under observation from 2 to 5 years, and up to the present time, there has been no further evidence of paresis. Similar cases have been spoken of as instances of pseudo-paresis. The differential diagnosis between paresis and alcoholic disturbances would have been uncertain at first, but the prominence of the characteristic hallucinosis, its typical course and the non-development of paretic symptoms during a period of years furnish the basis for a positive diagnosis.

The results in this group are less favorable than in the former. Eight of the patients still remain in the hospital and show evidences of permanent deterioration of varying degrees. Seven cases could not be traced, but of these five, at the time of leaving the hospital, showed undoubted evidences of deterioration. Only four patients, and these all after first attacks, are reported by relatives to be abstinent, industrious, and to appear as well as before the psychosis. The others are said to be working irregularly, drinking frequently, and showing symptoms which cause their relatives to report that they are not so well as before the attack.

ALCOHOLIC DELUSIONAL INSANITY.

The term *alcoholic delusional insanity,* has been used for cases in which delusion formation has been the dominant symptom.

In a small percentage of cases, the delusions develop in men of middle age, without a history of any hallucinatory disturbance. Of these cases it may be said that in each instance there was a history of almost daily alcoholic indulgence for many years.

The large majority had some form of hallucinosis, as a symptom and basis for the elaboration of delusions of persecution, influence and marital infidelity which were the most frequent. Ideas relating to drugging and poisoning were common, and in several cases grandiose tendencies with changes in personality were seen.

There is a tendency to chronicity and relapses in cases that show improvement. The following abstracts are from representative cases:

Case XII.—David M. Born in Ireland. Aged 42. Laborer. Married. Neurotic heredity. For over 20 years, he had used liquor and beer almost daily, and frequently went on protracted sprees. He was treated in the Worcester Insane Hospital 15 years ago, for "Acute Alcoholic Delirium," and was discharged "recovered." He resumed his habits of hard drinking, but worked steadily up to 1901, when he gradually ceased working and rarely drank, as he had no money. The police had recognized that he was odd and peculiar for several years. His wife, an ignorant woman, was unable to give any satisfactory history of this period. He was admitted to the Danvers hospital about one year ago. He was poorly nourished, showed enlargement of the heart, with a systolic murmur. The tendon reflexes were active. There was a coarse intention tremor of the upper extremities extending to the neck muscles; he was unable to carry a glass of water to his mouth or to write properly, making a coarsely tremulous signature only after great efforts and by grasping the pencil with both hands. This tremor was said to have been present in many members of his family for three generations. He talked freely when admitted, was perfectly oriented for time, place and persons. His school knowledge was well retained and he had a fair knowledge of current events. His memory was apparently unimpaired for recent or remote events, but some tendency to falsification was noted. He said that for some years he had heard "voices around the corner," and remarks made about him as he went along the street. He heard voices telling him things he wishes to know. Feels strange sensations in his body. He had formed many delusions with little system. He thought that there had been a conspiracy to prevent the Irish Catholics getting work and said he had noticed it for 13 years. He said that the brains and education of the Irish had been taken away from them and attributed it to a change in religion. Voices told him that priests were maltreating nuns on church property, and he hung around the grounds to protect the latter until he was driven away. In addition, he had many ideas of the persecutory type. Soon after admission, he became

surly and evasive, forming delusions about his present surroundings. He was frequently abusive to attendants and physicians whom he accused of trying to injure him. He asserted that the physician did not intend to release him and asked,—"Can you assign any reason why there is a weakness in my legs and a string across my eyes when you pass?" He made many unfounded accusations concerning the management of the hospital and thought that there was a persistent effort to ruin the Irish patients. At one time, he heard women singing through his viscera and at times voices gave him information. During his stay at the hospital, he has been lazy and inactive, refusing to take any part in hospital duties or recreation. He accepts everything as a matter of course and shows no normal interest. He reads and can converse on the topics of the day and at all times is oriented and has a good memory. He still remains at the hospital, his condition being unimproved.

Case XIII.—Michael D. Born in Ireland. Aged 34. Married. Laborer. Father intemperate. Sister insane. In early life the patient worked in a brewery, drank large amounts of beer and whiskey daily, and was often intoxicated. In 1896, he was committed to the Worcester Insane Hospital. The onset was sudden, following prolonged drinking. There were auditory and visual hallucinations. He was apprehensive and attempted suicide. There was a steady but gradual improvement, the visual hallucinations disappearing in a few days and the auditory in three months. He was discharged "improved" the following February.

For a time, he appeared well but resumed his drinking habits, and soon began to be suspicious of his wife accusing her of intimacy with other men. He misinterpreted her actions, fancying that some ordinary act was a signal to other men. He became unable to apply himself to work and was committed to Danvers in March, 1903. On admission the physical examination was negative. He gave a history of intermittent hallucinations, auditory, visual and tactile, for some years, but of little reaction to them. He had well defined persecutory delusions, and was jealous and suspicious of his wife. He was perfectly oriented. His memory was good. His emotional attitude was indifferent, almost apathetic. He was taken from the hospital by his family in August and re-committed in November, 1903. While at home he had refused to do any work, and had been irritable and had had delusions. Upon his return these were more pronounced. He imagined his wife exerted an evil influence over him. He said, "Sometimes I feel good and strong, but my wife has a power to take this from me, and I bear more of a woman's form than a man, and I can't help it. It is all her fault trying to be over me." He says he hears her give a command and then feels his strength leave him. He accuses her of infidelity, and says he has seen "the retracted shadow of a young man" in the act of coitus with his wife. He accepts the situation with little show of resentment. At the present time the delusions are practically unchanged. He has a good memory for dates and events. His school knowledge is well retained. There is marked emotional deterioration as shown in his indifference and lack of interest in the present and future.

In Case XII, we have a history of delirium tremens in early life, with apparent recovery and a subsequent resumption of the drinking habits, followed many years after by the development of hallucinations and the elaboration of a delusion system affecting himself, his countrymen, and all relations with his fellow-men.

In Case XIII, there was an attack of hallucinosis at the age of twenty-six with questionable recovery. The patient resumed his drinking habits in a short time, and there was a gradual development of delusions of influence, persecution and marital infidelity, with apparent improvement following hospital life and a prompt relapse when returned to home influences.

In the 34 cases of the group, 15 were of native, 19 of foreign birth. All were laborers, tradesmen or small dealers. Twenty-nine were married, 5 single; 19 of the number would have to be considered as below the average in mental capacity. A satisfactory family history was not obtained in eight cases, but in 50 per cent. of remainder there was a record of psychoses, neuroses or intemperance in immediate relatives. The average age on admission was 44 years. Seven used beer or ale as their favorite drink; 27 had a preference for distilled liquors, but, as in the former cases, all used more or less distilled drinks. As to the manner of drinking, four were in the habit of going on periodical sprees, with intervals of comparative abstinence, but in 30 cases there was a history of steady, almost daily drinking, and frequent intoxication in the great majority of these. Eleven had had a previous attack of delirium tremens, or hallucinosis, from 4 to 15 years previously. Five had had two or more attacks, none being later than two years before admission. Four had made attempts at suicide, and seven had threatened to kill themselves. Thirteen showed no definite neurological symptoms. Exaggeration of the tendon reflexes was twice as common as diminution. Tremor, more or less pronounced was seen in 50 per cent. of cases and in 7 unequal or sluggish pupils were noticed. Six cases had no history and presented no evidence of hallucinations. It is interesting to note that the average age of this number was 54 on admission; that all had been addicted to daily drinking for over 25 years. Without exception, they were men little affected by large amounts of liquor in early life. Of the entire number, 9 had auditory hallucinations, 3 had auditory and visual, 10 had auditory, visual and tactile, and

6 had auditory, visual, olfactory and tactile. The delusion system in many cases was based upon the hallucinations, but was elaborated to an extent not seen in the subacute hallucinosis. Nearly 50 per cent. of the married cases showed delusions of marital infidelity, the most common and natural acts of the wife being interpreted as evidence of her guilt. Many believed that attempts had been made to poison them, hallucinations being often the basis for this belief. Various somatic ideas were common and seemed to have the same basis.

In others, persecutory ideas were developed, changing according to the environment of the patient; changed personality, and grandiose tendencies were seen in some of the more severe cases. A listless indifference to the delusions was common after some months' duration, many patients speaking humorously of their fancied trials, while there was still lack of insight. Twenty-three cases were discharged from the hospital, and in these, the average duration of the disease from its inception to the time of discharge, was nearly two years. In the 11 cases remaining in the hospital, the average period of observation has been four years, with apparent prospects of improvement in two cases only. Thirteen of the 23 discharged cases have been traced and after a period of from one to four years, only four are reported by relatives to have resumed their work and family relations without appreciable detriment from their psychosis. The other patients have either resumed their habits of inebriety or display mental symptoms recognized by relatives.

ALCOHOLIC DEMENTIA.

Under the term alcoholic dementia have been grouped the cases of primary deterioration, not intimately related to other forms of the alcoholic psychoses. The resemblance between this condition and paresis is often perplexing, and the differential diagnosis can be made only after prolonged observation; the development or non-development of positive paretic symptoms being the only reliable guide to diagnosis.

Case XIV.—E. F. J. Born in Mass. Age. 49. Married. Theatrical manager. No heredity. He was above the average in mental capacity and up to recent years had managed a successful business. First attack. For

over 30 years the patient has been addicted to the daily use of whiskey and for ten years has averaged from one to two pints daily. He rarely became so intoxicated that he could not walk steadily, as large amounts affected him but little. His drinking habits increased to such an extent that he became incapable of attending to his business, because of his constantly semi-intoxicated condition. He was committed to the Danvers hospital in 1899, and discharged, improved, after a residence of three months. At this time, he showed some memory defect for recent impressions, and did not display a normal appreciation of his condition. For some months after his discharge, he was abstinent and resumed his business, but soon began his daily drinking, and was in a maudlin condition most of the time. For three years, he managed to make a poor living and then lost his business, and for over a year before his last admission had practically done nothing; his home was broken up, and he was again committed to the Danvers hospital in 1903. He was semi-intoxicated at the time of admission, but on the following day was oriented and had a good grasp of his surroundings. His school knowledge was fairly well retained, and he was able to remember remote events clearly, but was uncertain about dates. There was no evidence of hallucinations or delusion formation. He has now been in the hospital for over six months, showing no change in his mental state. He is mildly euphoric, inclined to jest about his habits, speaking lightly of his family obligations, slightly resentful because his wife does not take a more active interest in him, after all he has done for her, but thinks that his drinking has worn out her affections, and when he leaves the hospital,—something he shows little interest in doing—he intends to make his home at a hotel. He is confident that he can get a good situation at a large salary and will do that rather than resume business. He is fond of games, his pipe, and joking with other patients. His letters to relatives consist largely of request for tobacco and sneering allusions to their lack of interest in him. He takes little interest in current events outside of his small circle. His memory for general events can be estimated when he says,—"Cleveland, Hayes, Garfield and Roosevelt," have been our last presidents in order of succession. He passes hours daily lying idly about the wards. In a chance meeting he would present a fairly good appearance, but his memory, judgment, emotions and powers of initiation are so much impaired that he is a mental wreck. His physical condition shows nothing of special interest.

Case XV.—John L. Born in Mass. Age 47. Married. Saloon-keeper. Mother insane. First attack. For over 25 years has used liquor daily, whiskey being his favorite drink. In early life, large amounts did not affect him, but in recent years, his resistance was much diminished, and smaller amounts made him quarrelsome and unreasonable. For some time he had not managed his business successfully, having had difficulty with his accounts and showing a waning capacity for management. Members of his family reported that his disposition had changed materially in the past five years. He became silly and garrulous when sober, and suspicious,

irritable and unreasonable in his family relations when under the influence of liquor. He drove his customers away by his demeanor toward them, and was in financial trouble when admitted to the hospital in 1903. Aside from a hypertrophied heart and slight nephritis, the physical examination revealed nothing of special interest. He was perfectly oriented. His memory was imperfect for recent events of common interest, and he was unable to retain new impressions well. To the physicians he was pleasant and garrulous, making long tedious explanations to show that his actions were justifiable, but showed no actual delusions, and no hallucinations. He showed imperfect insight, great emotional deterioration, dulling of the finer susceptibilities and impaired judgment. He was inclined to look upon his commitment as a great mistake, on the ground that he was perfectly capable of regulating his habits, but viewed the matter in the light of a joke, of which he did not realize himself to be the victim. Throughout his hospital residence of two months, he was the butt of other patients who had no difficulty in playing upon his fears with absurd predictions as to his future. There was no improvement in his mental condition at the time of his discharge.

In cases XIV and XV, we have a history of daily drinking for many years, followed by gradually decreasing powers of resistance to alcohol, and increasing mental enfeeblement as the first symptom. The mental impairment shown is characteristic of the remainder of this group. Thirteen cases of dementia have been observed, nine of the patients were of native, four were of foreign birth. Eight were married, five single. Eleven were laborers or tradesmen. Eight would be considered below the average in mental capacity. Distilled liquor was the usual drink of twelve. The average age on admission was 51 years. With one exception, the entire number had been daily drinkers for periods varying from 20 to 40 years. Drunkenness had frequently increased with advancing years, and was usually the direct cause for commitment. Five had had one attack of delirium tremens or hallucinosis from 5 to 14 years before admission. One had had two attacks, the last over 15 years ago. There was a history of recovery from these in each case. Ten of the patients were free from any form of hallucinosis during observation. Three had transient auditory or visual disturbance at the time of admission, and these three were the only ones to show any delusion formation, which was of short duration and based upon hallucinosis. There was a permanent memory defect in every case, imperfect recollection of recent events being pronounced.

Two made suicidal threats at different times, and two made suicidal attempts while under the influence of liquor.

The neurological symptoms were more prominent in these cases than in the other groups. Unequal and sluggish pupils, Romberg's symptom, ataxia, tremor, and changes in the tendon-reflexes were symptoms noted separately or in combination in nine of the cases.

The *prognosis* is unfavorable. There is usually sufficient improvement from the immediate effects of hard drinking to warrant removal from the hospital in a few months.

Of eleven patients discharged within the past five years, six have been traced and only two are capable of doing any regular work and none were believed by relatives to have recovered their normal mental state.

Epileptiform convulsions has been a symptom about equally divided between the several groups, 10 per cent. of the entire number having had from one to several seizures during periods of hard drinking. There were no convulsions after admission to the hospital.

Some conclusions drawn from a limited number of cases are as follows:

I. Heredity of insanity or intemperance is common, and has an unfavorable influence on the course of the disease.

II. The persistence of tactile and olfactory hallucinations in cases of subacute hallucinosis affects the prognosis unfavorably.

III. Somatic and grandiose delusions or a changed personality in alcoholic delusional insanity indicate a chronic course, with a probable unfavorable termination.

IV. A history of periodical habits of drinking is more common in delirium tremens and hallucinosis, and of daily drinking in the delusional type and dementia.

V. The free use of distilled liquors is noted almost without exception in all cases.

VI. Hallucinosis but rarely developes directly from an attack of delirium tremens, but is often preceded by one or more attacks.

VII. Alcoholic hallucinosis often serves as the basis for elaboration of the delusion system seen in the delusional type.

A CASE OF MORAL INSANITY WITH REPEATED HOMICIDES AND INCENDIARISM AND LATE DEVELOPMENT OF DELUSIONS.[1]

By HENRY R. STEDMAN, M. D., Brookline, Mass.

On October 30, 1901, J. T., a professional nurse, about forty-five years of age, single, and born in this country, was arrested on the charge of murdering Mrs. M. G. at Cataumet by poisoning, on the 13th of the preceding August. There was sufficient ground for belief that she had also fatally poisoned, within the preceding six weeks, an entire family of three persons who were related to M. G. The duration of the last illness of Mrs. M. G. was not over sixteen hours. The symptoms, which were similar in all the cases, were those of narcotic poisoning. M. G. went unexpectedly into a somnolent condition from which she could not be roused, and coma and death soon followed. The relatives who, as it was believed, met death at J. T.'s hands were Mr. and Mrs. A. P. D., her father-in-law and his wife, and Mrs. H. G., their daughter, on all of whom she had been in constant attendance from the first.

Mrs. D. died on July 4, after an illness of eleven days. The illness was characterized by intermittent coma, occasionally deep. In the intervals: drowsiness with occasional rousing up and partial consciousness. Pupils contracted, but not firmly, with dulled sensibility to light. On one occasion improvement with rationality, succeeded by profound coma and death.

Mrs. H. G., who died July 31, was ill ten days or two weeks, with similar symptoms. She became dull and stupid, "moped around the house, and finally went to sleep and never woke up."

Mr. D. died Aug. 9, after an illness of seven hours in which somnolence predominated, and complete unconsciousness rapidly supervened.

They had all been in good health before the appearance of these

[1] Read April 21, 1904, before the Boston Society of Psychiatry and Neurology, and the Am. Medico-Psychological Ass'n, May, 1904.

symptoms. The nurse had for years been on an intimate footing with the family, who were attached to her and regarded her as one of themselves. Her services were offered at some suggestion of hers or theirs regarding trivial ailments, real or fancied. She gave enemata freely, and often administered medicines in that way.

These short and fatal illnesses, so much alike and of such an unusual nature, occurring as they did, one after another, in the space of a few weeks, finally aroused suspicions of foul play, which naturally centered in J. T. who had nursed and dosed the victims, and had only summoned the physician when they were at the point of death. That she was well aware of the sentiment against her there is no room for doubt, as she was not only pointedly questioned on the subject by several persons but was actually told by a relative of one of the deceased that she was suspected of causing the deaths. Notwithstanding this, we find her in her old home only a fortnight later in L. in attendance on Mrs. B., an old lady and friend, who is suddenly and unexpectedly taken ill soon after J. T.'s arrival, and dies within forty-eight hours of the first appearance of a train of symptoms closely resembling those in the case of Mrs. M. G. The analysis by Dr. E. S. Wood, professor of chemistry at the Harvard Medical School, of the organs of four of the bodies revealed the presence in each of more than sufficient morphine to cause death. In the liver of the other body, that of Mrs. D., he found very distinct traces of morphine. It was the only one not embalmed, and as it had been buried nearly four months the organs were in an advanced stage of decomposition.

One of these persons held a note of J. T.'s to the amount, it is reported of several hundred dollars. She was also accused after her arrest of having stolen from three of the others, sums of money which were missed after their deaths, but there is no proof of the truth of these charges. There was no suspicion of theft from the other victim, and in the search for a motive in her case a threat of exposure was advanced by the relatives. While Mrs. B. was in the midst of her illness a detective called at the house, and in the room below the sick chamber questioned J. T. at length about the deaths of her last four patients, ostensibly with the view of fastening the guilt of murder upon another person.

Throughout the entire interview she was calm and self-possessed, showing no trace of anxiety and talking freely and pleasantly. She made no attempt to implicate others. Not long after this she told one of her friends that a state detective had told her that she was suspected of the crimes and must prepare to defend herself.

She remained here about a month, entertaining her friends,—in the meantime writing the physician of one of her Cataumet victims, "I have been taking my vacation and am willing to come back any time for a case." On September 29 and 30, 1901, she made two attempts to poison herself, probably with morphine, the last an apparently determined one. An emetic given after an hour and a half was followed by return of consciousness. She gave later, as her reason for these attempts, that she was jealous and desperate because a man of seventy years, a connection of Mrs. T., was very attentive to one whom he has since married. As a final attempt to induce him to break off this intimacy J. T. wrote him, from the local hospital where she was sent immediately after these attempts, an absurd and abusive letter in which she accused him of being "the father of her unborn babe."

After leaving the hospital she made a visit to some friends in a neighboring state, of which she has lately written: "I never even thought of the investigation about the murder while at A. until I was arrested. I was having a fine time out there. I don't think I ever enjoyed myself as I did that fall. There was a jolly lot of people there, and I had the kind of time I like to have. I remember perfectly well the detective reading the warrant and saying, 'I have come to arrest you for the narcotic poisoning of Mrs. G.,' and even then I cannot think it made much impression on me. The funniest thing about it was that I was annoyed because the detective insisted on remaining in my room while I was getting ready, and I did not think it was very gentlemanly." She left the house, on her arrest, with perfect composure and without the slightest remonstrance. On the long trip to the jail she was at first thoughtful, but later talkative and in good spirits. She talked freely to the officers about herself, and seemed entirely willing, then and at the jail, before seeing her counsel, to admit her guilt, and showed little or no realization of her situation, a condition of mind which she maintained throughout her imprisonment and

trial. She was indicted for the murder of three of her Cataumet patients, but her trial was upon only one count, that of the murder of Mrs. G.

On March 3, 1902, about four months after her arrest, the prosecution and defence effected an arrangement whereby Dr. Geo. F. Jelly, Dr. Quinby and the writer were called upon to conjointly examine and report upon the mental condition of the prisoner with reference to her responsibility. Thus the question was practically submitted to a commission at law, which allowed the examiners free interchange of opinions and impartial sifting of all obtainable evidence on both sides. In fact, it resolved itself into a medical consultation on the diagnosis of a case of alleged disease. A more practical and satisfactory method, and one more in keeping with the principles of scientific inquiry, could not have been chosen, and its adoption by the attorney-general in such an important case would seem to be a long step toward abolishing, in criminal cases at least, the opposite and customary practice which has done so much to discredit expert opinion.

The evidence upon which our opinion was chiefly based was in part furnished by the prosecution and in part collected by ourselves. Since the patient's commitment other facts antedating her arrest have been brought to light, and are here introduced for the sake of uniformity and completeness.

Her original name was Honora Kelly. In 1863, when about four years of age, she and a sister were placed in a foundling asylum by her father, an eccentric man who drank hard to the time of his death. She has two living sisters; one, a respectable and capable woman some years older who corresponds regularly with J. T., the other, a chronic dement in one of our state asylums. A third sister was adopted but turned out of doors when found to have an illegitimate child. She led a dissolute life and died recently.

When about six years of age Honora was apprenticed to Mrs. T. on indenture papers, and took the name by which she has since been known. She was given a good education, proving intelligent and quick to learn. Mrs. T. brought her up as a daughter and she was "made much of" by the family. Until J. T. was a woman she was under good moral and religious influences, home surroundings and discipline and had good associates, but her incorrigible propensity for deceit, falsehood and trouble-making, never absent from the first, proved too much to contend against, and her mother finally refused to allow her to remain longer in the family.

Her impossible tales and her lies, often senseless and doggedly persisted in, despite positive proof of their falsity, are well remembered in the neighborhood.

At twenty-eight she began her career as nurse by four years of training and service in two general hospitals. There she showed much capability in the technical part of her duties. "She knew how to take good care of her patient but did not like to work." Although not of attractive appearance, she had a pleasant manner, and was wonderfully clever in ingratiating herself with such patients and physicians as she wished to please, and remarkably skilful in escaping the consequences of wrong-doing and in implicating others. Her hospital life revealed her earlier tendencies, but aggravated in form and more serious in results by reason of the greater opportunity for their exercise. Among the nurses, also, she made friends. One of them states, nevertheless, that she was looked upon as "queer" and "peculiar" by her fellow-workers because of her unfounded and absurd suspicions, tale-bearing, slanderous gossip and consequent mischief-making, as well as her pleasure in inventing fabulous tales. In several well authenticated cases she attempted, by charges afterwards found to be false, to procure the removal of patients from the institutions, and succeeded in two instances. [In connection with one of these cases she wrote one of the patient's friends, who had met her only casually, a peculiar letter, stating that as he had made inquiry about her family (which he had not done), that she was quite willing to tell him that her brother was in an insane asylum. She then went fully into her family history.] On the other hand, she is known to have prolonged the illness of favorite patients whom she wished to keep in the hospital, by reporting symptoms that did not exist and falsifying temperature records. In other cases she recorded false temperatures for no obvious reason. During her term of service at one of the hospitals many articles were missed: sums of money, stationery, aprons, uniforms, etc., and she was suspected of stealing them, but her friends spoke so well of her and she was so adroit that the suspicion went no further, in spite of the evidence against her. In administering medicines she was extremely reckless and frequently gave larger doses than had been prescribed. Even at that time she was often heard to say that there was no use in keeping old people alive (a favorite sentiment with her since). She was also fond of asking about poisonous drugs and their antidotes.

In view of the long wake of sudden and mysterious deaths of patients, which followed this woman throughout her career as a nurse, the following incident of her hospital life is at least worthy of passing notice. Miss D., a nurse, who had a slight illness, was put under her charge by day and was soon seized with sudden and extreme collapse. By much effort she was brought out of danger in the course of the night. When J. T. came on duty the next day the same symptoms reappeared. Another nurse was put in charge and the patient recovered. Some time afterward J. T. asked a head-nurse if she had heard that Miss D.'s condition had been due to poison.

She was at that time, and has often since been, suspected of the opium habit, because of her strange conduct. This is of course possible, but careful inquiry, as well as long observation of her at times when such a practice if previously indulged in to a great extent would have been revealed in the characteristic symptoms which follow sudden deprivation of the drug, has failed to show any such addiction. Moreover, her general conduct has since been the same or more marked in situations where opium-taking was impossible. No tendency to sexual immorality or to drinking habits was ever noticed in her so far as we can learn.

She was discharged from both hospitals, in one instance just as she was about to graduate from the training school.

On leaving the hospital she took up private nursing in which she was for many years very successful, inspiring certain families, not a few of them of high social position, with confidence in her skill and affection for herself, in spite of caution from physicians who knew her record. She was "greatly liked and trusted" by one family who unsuspectingly employed her after the death of one of their number at her hands. Experienced and able physicians recommended her for a time on account of her capability. Her own friends who know her better speak of her jealous and vindictive nature and bad temper. Her conduct was considered "strange" by not a few—just in what way they cannot specify. As to her propensities for falsehood one person reports: "She had an extraordinary facility for inventing lies and remembering the lies that she told others." Another: "She is a constitutional and clever liar, but I did not find it out until two years ago." Her passion for trouble-making for its own sake, by carrying tales true and false and insidiously fomenting enmities for no apparent reason, though far less readily and generally realized than when she was at the hospital, came gradually to light. She borrowed money from patients or their relatives which she never repaid and, although she earned a good living, had many debts, which, however, gave her little concern. Occasionally, small sums of money and articles of clothing disappeared where she was employed, but she was rarely suspected and never detected in theft nor, to our knowledge, directly accused of it. Accepting her guilt in this respect as proven, however, the fact that, except in a few instances, they were all petty thefts, and that in many cases nothing whatever was missing, plainly shows that money gain was not a controlling motive for her homicides. She undoubtedly prolonged some cases for profit, but on the other hand cut short many that might have proved equally lucrative, by poisoning the patient. She set four fires, but gave the alarm and helped vigorously to put them out. Two were set in the same house in order to frighten a nervous patient and retard her improvement. The others occurred in cottages of her friends.

Her general conduct toward the end of her career as nurse is suggestive of increasing demoralization. Her stories grew more sensational and preposterous. She caused, for example, some consternation by an utterly baseless report of a severe epidemic of typhoid in a neighboring seminary.

She repeatedly maligned physicians who had employed her to other physicians and to patients, and even criticised the method of treatment in the presence of physician and patient. In spite of this, she retained to the last a number of friends who thoroughly believed in her.

We have also been able to satisfy ourselves that to crown this career of crime and disordered conduct J. T. committed 20 homicides, 12 of which she admitted at the time of our examination. While in jail she made a list of 31 of her victims, for her counsel, giving names and addresses or other means of identifying them. Her statements regarding the 20 homicides are abundantly verified in 4 by the character of the symptoms and by autopsy; 12 are sufficiently proven by careful accounts of the train of symptoms magnanimously and freely given the writer by the attending physician in each case, which were in every instance but one characteristic of narcotic poisoning, and which they now agree to have been the cause of death; and 4 have been fully, and we believe faithfully, described by immediate relatives. Of the 11 deaths reported by her, above this number, 4 are yet to be investigated, but seem suspiciously like the others in causation; in 2 the whereabouts of the family are now unknown; while in 5 there is too much uncertainty as to the precise cause of death to warrant including them among her victims. Space will not admit of further description of these cases. The manifestations were strikingly similar. All but one of the cases—in which strychnia was plainly the cause of death—showed all or most of the following symptoms: drowsiness, full, slow pulse, contraction of pupils, stertorous breathing, cyanosis and slow respiration. A not infrequent feature was the subsidence of the coma for one or more intervals, and the patient's return to full or partial consciousness until finally put to death. A number of her victims were patients of one of her chief benefactors and includes one of his connections.

Among her effects a much-worn textbook on poisons was found which fell open at the chapter on opium.

At out first interview at the jail, she seemed for a time somewhat serious and distrustful, but soon became at ease and talked freely, volubly and intelligently. She appeared quite indifferent to her situation and seemed to regard our visits chiefly as pleasant breaks in her monotonous life. Her talk was more or less rambling and rather irrelevant. Her utter mendacity and disposition to speak slurringly of even her best friends and to make accusations against them, almost without exception—to praise one minute and blame the next—was very marked. We therefore soon found that we should be obliged to depend largely for our opinion upon facts obtained from others, accepting as true only such of her statements as were corroborated by reliable evidence.

She told many tales which we knew to be sheer inventions, among them, a story of her parentage, her alleged father having in reality lived in China for two years immediately preceding her birth; another, of her horror of the dead which was so great that she sometimes fell senseless at the

sight of dead bodies, even those that had died a natural death, the fact being that she had often laid out bodies with her own hands as a matter of course. Her attempts at suicide she narrated with glee, but admitted that the last was a serious one, and for the most part adhered to her story that jealousy had prompted them. She also stoutly denied that she had ever stolen anything or been dishonest in money matters, although admitting that she had failed to repay loans of money and that she had always been slack and "mixed up" in money affairs. At first she denied also that she was guilty of the homicides with which she was charged, but finally, and by no means unwillingly, confessed (although advised not to incriminate herself) that she had poisoned twelve patients and had made two unsuccessful attempts to poison others. She also admitted that she had set four fires, two of them at the residence of a patient under her charge. She told of the deaths with calmness, adding eulogistic remarks. The poisonous agent employed was, according to her story, always morphia, occasionally combined with a fatal dose of atropia. She could not remember the details in all cases because, as she remarked, "poisoning had become a habit of her life."

[The facts: first, that her favorite method of administration of the drug was in Hunyadi water or by enemata because the drug could in these ways be given without the knowledge of the patient; second, that when possible she did not summon the physician until the victim was moribund: and finally, that she sometimes so combined drugs in kind and proportion that their resulting effect was an unusual and perplexing set of symptoms, made it most difficult and in some instances impossible for the physician to ascertain the true nature of the patient's illness. A request for an autopsy by the physician, moreover, invariably met with refusal through J. T.'s vigorous opposition to the suggestion. This accounts in large measure for her long immunity from detection, and it seems probable that if she had not, in her increasing mental demoralization, so far abandoned herself to her craving for poison-giving as to put to death with the same drug or drugs four patients in one family within forty days, many more victims might have been added to the list.]

In planning and carrying out her homicidal acts she was, she asserted, always calm and clear-headed. After administering the poison she always experienced great relief and went to bed and slept soundly. In one case she is known to have taken to bed with her the child of her victim after administering the fatal dose, and in another, according to her statement, she lay on the bed with the patient whom she had just poisoned "and had a long sleep." When it was too late to undo her work "she would work like a Trojan to save the patient," although in one case, at least, she took this opportunity to repeat the dose and make sure of her victim. In two instances she claimed to have been seized with compunction, and left the case after sending for another nurse. One of the patients was saved in consequence. For much of the time during the interviews she manifested a lack of seriousness and often a levity which was in marked contrast to

what was to be expected of one who had been brought to confess so many heinous crimes. She understood clearly that she had done wrong, but did not manifest the slightest sign of remorse for her crimes, not, as it seemed to us, through any spirit of bravado but for the reason that she did not comprehend the enormity of her acts; she professed total indifference as to the outcome of her trial except that she preferred the prison to the asylum. Electrocution apparently had no terrors for her. "When I try," she said, "to picture it, I say to myself, 'I have poisoned M., my dear friend; I have poisoned Mrs. G.; I have poisoned Mr. D. and Mrs. D.' This does not convey anything to me, and when I try to sense the condition of the children and all the consequences I cannot realize what an awful thing it is. Why don't I feel sorry and grieve over it? I cannot sense it at all."

The question as to what prompted her acts was the signal for the shameless recital of a story of sexual excitement occurring in the presence of a dying person, as the motive—a statement which was all the more startling by reason of the absence of sexual immorality from her history, so far as could be ascertained. For a time we were of the belief that irresistible sexual impulse might be the real explanation of at least some of her acts, but on further examination, her representations as to the nature of this impulse and the conditions attending it were found to be so conflicting and so at variance with any known form of sexual perversion that feigning was suspected, and at the last interview, she admitted, as stated in our report, that she did not know why she killed these people, and that it was not from desire to experience sexual excitement. It was finally apparent that the story was a pretense throughout, concocted, and most unnecessarily as it happened, in order to prove her insanity and irresponsibility by reason of irresistible sexual impulse. There seemed to be a nearer approach to the truth in the statement that for at least the year past she had been tempted to do all sorts of criminal acts, and during the preceding summer especially she had "let herself go." Among others she had strong impulses to set fires and could get no relief from her feeling of uneasiness but by yielding to the temptation. It is a fact that when once they were started, however, she worked her hardest to put them out. She finally said, in regard to her homicides, "I seem to have a sort of paralysis of thought and reason. Something comes over me, I don't know what it is. I have an uncontrollable desire to give poison without regard to the consequences. I have no objection against telling my feelings, but don't know my own mind. I don't know why I do these things." The last statement carried an air of truth with it in the manner of its telling and seemed to accord well with her general mental condition.

So far from having delusions of enmity or persecution, she spoke of most of her victims as her friends, and denied any hostility on either her side or theirs. In fact, all our efforts failed to reveal anything of the nature of delusion or hallucination in her mental condition at any of the interviews. Her behavior also was the opposite extreme of that of most patients with concealed delusions, whose reticence and distrust are marked features.

The main points in the summary of our opinion as to the prisoner's mental condition, which concluded our report to the attorney-general and counsel for the defence, were in substance as follows:

"1. The prisoner, J. T., comes of a family in which intemperance and mental weakness and disorder are prominent disease features.

"2. Her utter lack of moral sense has been evident from childhood in her incorrigible proclivity to falsehood, dishonesty, mischief-making, general unreliability and probable theft. The good moral, mental and religious training which she received in her youth resulted in no modification of her character, and were practically thrown away on her in that respect.

"3. Her moral insensibility is further apparent in the absence of sense of fear before, during or after the commission of her crimes, and of remorse, sorrow or genuine affection at any time. This defect is even more forcibly shown by the fact that her chief victims were her especial friends.

"4. Her lack of any appreciation of her situation, her levity under such circumstances, and her inability to realize the enormity of her deeds are strong evidences of mental weakness.

"5. That an irresistible propensity propelled her to crimes of arson and murder is shown by the great frequency and variety of such acts and her continuance in them, regardless of consequences.

"6. There is an absence of any apparent motive for her criminal acts in some cases, and inadequacy of motive in many of the others. This is shown in the total lack of evidence of pecuniary gain or satisfaction in revenge as a rule, except minor thefts and transient enmity. These would be powerless with sane criminals as incentives to habitual homicide.

"7. The prisoner's disease-history and present mental state correspond with a well-recognized form of mental defect of a moral type due to congenital degeneration, in which there may be little or no intellectual disturbance that is apparent to the ordinary observer.

"Therefore, we are of the opinion that she was insane and irresponsible at the time of the homicides with which she is charged, and is so now; that, her disease being constitutional, she will never

recover, and that if ever at large again she would be a constant menace to the community."

The salient features of the case which indicated more especially irresponsibility were: lack of moral understanding, of natural feelings and of the ordinary motives for conduct including criminal acts, also the general absence in her of sufficient self-control to restrain her from crime, and her disregard of consequences as shown, for example, in continuing to poison patients in full knowledge that her guilt in other recent cases was suspected; by her desire to confess her guilt at the outset; her indifference to her fate, etc. These facts seemed to us to evidence her inability, both to help doing what she did and to be affected by punishment, conditions which are the best tests of accountability.[2]

The results of the anthropometrical measurements and physical examination of the patient by Dr. H. W. Miller, pathologist of the Taunton Insane Hospital, are as follows:

Physical Examination.—Height, 5 ft. 3 in.; weight, 166½ lbs.

A well developed and well nourished woman. Hair black, streaked with gray. Complexion somewhat sallow.

Craniometric Examination.—Circumference of head, 51.8 cm.; antero-posterior diameter, 17.8 cm.; greatest transverse diameter, 13.6 cm.; cephalic index, 77.6 cm. (slightly dolichocephalic); naso-occipital arc, 31.5 cm.; bregmato-lambdoid arc, 11.8 cm.; binauricular arc, 31.5 cm.; binauricular diameter, 11.8 cm.; facial length, 11.7 cm.; mid-frontal diameter, 13.5 cm.; breadth between pupils, 6.6 cm.; length of ears, right, 6.4 cm.; length of ears, left, 6.5 cm. These measurements are all well within physiological variations.

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[2] The ability to discriminate between right and wrong as the sole test of responsibility fails in this case for the same conclusive reasons that have rendered it valueless in a great many others, and have caused it to be rejected by all alienists and most jurists of to-day. It takes no cognizance of the power of personal restraint and inhibition. An insane person, as all psychiatrists know, may know right from wrong in the abstract, may understand that a certain act is unlawful and wicked, but may be unable to control himself through weakened will power (the result of hereditary defect or disease), or when goaded to desperation by persistent delusions and hallucinations. "In fact, the cases of insane criminals in whom there is no knowledge of right and wrong or who do not know the nature and quality of the acts they commit are very few indeed."—(McPherson.) It was one of the highest legal authorities of England, Lord Chief Justice Cockburn, who declared twenty years ago that the power of self-control when destroyed or suspended by disease was an essential element of responsibility.

Ears: detail well defined without stigmata.

Eyes: brown, palpebral fissure of normal width. No limitation of normal field.

Palate: low and broad but symmetrical.

Nose: no deviation or anomaly.

Teeth: false set in upper jaw, those in lower jaw regular.

No facial asymmetry.

Extremities: symmetrical. Forearms, 40.2 cm. from elbow to tip of middle finger. Middle finger, 10 cm. on both hands, last phalanx of thumb 3 cm. on both thumbs. The little finger on each hand is flush with the last joint of the third finger. Finger nails normal.

No general body anomalies.

Special senses: hearing acute; smell and taste normal; sight unimpaired; color-sense keen.

General sensory condition: Examination of tactile, pain, pressure, and muscle-sense offers no abnormality.

No errors of motility.

No trophic disturbances.

General feeling of well-being.

Reflexes: nothing of significance. Knee jerks: sharp. Normal plantar flexion. Pupils equal and regular, reacting promptly, directly, and consensually.

A few tremors of tongue and extended fingers were present at time of examination but were transient.

Respiratory and circulatory systems reveal nothing of note.

Abdominal organs healthy.

Menstruation irregular for two years (every two weeks). Previous to that every fourth week.

Whatever view may be taken of this remarkable case, there can be no question that the moral monster thus far depicted is a striking illustration of so-called moral insanity, a condition described in most works by recognized authorities, from Pritchard to Kraepelin and Wernicke, as a probable form of mental disease or defect. Its existence as a definite morbid condition has been repeatedly questioned, and its name criticised as inadequate and incorrect. "Moral insanity," however, has so far held its own that all alienists of to-day recognize that the term means a certain condition or kind of mental abnormality which is *sui generis*. It fits no other form of mental unsoundness. The progress of psychiatry has seen so many nosological terms discarded that it is remarkable that "moral insanity" should remain and flourish, thus demonstrating its practical utility as a term and its real value

as a morbid mental condition. "Moral imbecility," a more accurate designation in some respects and in use by certain authors, apparently has not been found sufficiently descriptive of every grade of moral lunatic to secure general adoption. The true understanding of moral insanity has been greatly obscured by confounding it with purely symptomatic conditions, syndromes and stages of other forms of mental disease; for example, the moral obliquity unaccompanied by apparent intellectual perversion which sometimes occurs as a distinct stage of dementia præcox, or as an equivalent of the "maniacal" phase of manic-depressive insanity, or as the prodromal stage of general paresis.

Moral insanity belongs to the group known as insanities of degeneration, and is better termed *degenerative insanity of the moral type.* It should be exclusively reserved to designate a congenital, primary, constitutional and permanent mental condition affecting the moral nature and unassociated with evident intellectual impairment. These patients have good memory and understanding, ability to reason and contrive, much cleverness and cunning, and a general appearance of rationality, coexistent with very deficient control, absence of moral sense and human sentiments and feelings, perverted and brutal instincts, and propensities for criminal acts of various kinds which may be perpetrated deliberately and cleverly planned, yet committed with little or no motive and regardless of the consequences to themselves and others. This latter point is important as indicative of a perversion of the fundamental instinct of self-preservation (Kellogg). In their general conduct, also, these individuals are rarely influenced by the same motives that govern sane people, whether criminals or not, and it is often difficult to see what the motive is. They commit crime for crime's sake. Esquirol's remark that "crime is a means for the criminal and the end for the lunatic," is especially applicable to these cases. In J. T. most of the classic manifestations of the disease are typically and faithfully reproduced. That none of the physical stigmata of degeneration should be present is noteworthy but not exceptional, as Lombroso,[1] for example, finds anomalies of the cranium and physiognomy absent in 58 per cent and 64 per cent of moral lunatics, respectively. Of that dis-

[1] "L'Homme Criminel." (Tr. from the Italian.) 1895. Vol. ii, p. 8.

tinctive and negative feature of the disease, the almost complete absence of intellectual impairment, Hack Tuke[4] goes so far as to say, "It is perfectly certain that it may be practically impossible to detect the intellectual flaw, and yet a physician may be driven to decide that a person is insane," and it is a recognized fact that, while a few of this class fall short of the average individual in intelligence, many are fully up to it and a limited number even surpass it.[5] Others urge, and our experience inclines us to agree, that careful investigation will always reveal intellectual involvement in genuine cases, sooner or later, and such patients certainly share some traits in common with the imbecile; witness their characteristic propensity, which seems to be a necessity from which they can not escape, for telling purposeless lies and, like children, inventing fabulous tales. This is marked in J. T., but still more in this line of mental defect is her innate and irresistible bent for trouble and mischief-making which she finally carried to such an extent as to deliberately alienate her friends and benefactors among physicians —a weakminded senselessness of conduct which showed fatal disregard of her own interests. If her friends were blind to her glaring faults and dangerous propensities it is hardly to be wondered at that they should fail to recognize that underlying "intellectual defect [in moral insanity] which," to quote Westphal,[6] "is of a peculiar kind, is often concealed under a mask of perverted moral sense and requires time and patience on the part of the physician for its detection." J. T.'s fundamental intellectual weakness is further and strongly emphasized in her hospital history, as will be seen.

But in what respect this case and others of its class differ from mere criminality is, of course, the main question. We can, at the start, readily eliminate the occasional criminal, the criminal by passion, the habitual, professional criminal; but to differentiate between the morally insane and the instinctive criminal, especially in the light of Lombroso's exposition of their analogy, is a difficult matter. It is this question that is and always will be a battle ground for the criminologist, the alienist, and the jurist, in spite

[4] Dict. Psychol. Med., p. 814.
[5] McPherson, Mental Affections, p. 301.
[6] Berl. klin. Wochenschrift, 1878, No. 15.

of Lombroso's conclusion that both views are right and that they are one and the same thing. To our mind the very term implies a mental flaw, for what is instinctive criminality but perverted instinct, the very nature of which has made these persons lifelong enemies to society, and has rendered impossible a natural manner of feeling and acting, to the extent that in spite of good education and environment, habitually wrong conduct and actual crime become right to all intents and purposes and the ruling principle of life? It seems to us to resolve itself into a question of degree, and if Lombroso and his school should gauge instinctive criminality by the proportionate extent in each of these individuals of ordinary crime and culpability on the one hand and of mental defect and perversion on the other, wide differences would certainly appear which would compel them to classify many as indubitable criminal lunatics, and others as mere criminals, leaving an intermediate or borderland class whose condition cannot be satisfactorily differentiated. This is very evident in the enumeration by the great criminologist of many and marked symptoms which he admits that subjects of moral insanity share with those whom he acknowledges and classifies as insane criminals.

No absolute rule can be laid down by which we can differentiate between moral insanity and moral depravity, and there is no other disease in which the study *ensemble* of its manifestations is so important. One may single out separate acts or sets of acts of a subject of moral insanity, and see in them merely the manifestations of ordinary criminality. It is only when these are viewed in their entirety and in relation to the heredity, environment, education, social status, mental and physical organization and disease-history of the individual himself that we can decide how far his acts are under his control, and whether or not he is insane and irresponsible. It would be as questionable to label and treat as insane certain of the least pronounced subjects of this class as it would be wrong, both ethically and scientifically, to stamp as merely culpable criminals and to send to prison the extreme and typical ones like J. T. The former, whose condition approaches more nearly the borderland of sanity, are for that reason more susceptible to punishment and other incentives to right conduct. They bear prison life well and are none the worse for the discipline. The well marked, distinctly pathological cases, however,

are for the most part turbulent, crafty and unmanageable in the extreme, cannot be affected by punishment, greatly interfere with the discipline of others and are the despair of prison officials. Because of their defective control and susceptibility to criminal impulses, the associations and punitive measures of the prison also tend to make them deteriorate faster and to grow more intractable. The ordinary hospital for the insane is equally unsuitable for them, as they unsettle and excite their fellow patients and interfere with their management and improvement. Besides, association with criminals adds another terror to insanity. The special asylum for the criminal insane is, therefore, the only proper place for them, and it is still another argument for their insanity and irresponsibility that every criminologist advocates such confinement for them with this, the worst, class of the insane. There is, unfortunately, no special provision in Massachusetts for the care of female criminal insane, as their number is so small.

On June 3, 1902, J. T. was tried and found not guilty by reason of insanity, and thereupon committed to a state insane hospital for life. Her attitude at the trial was more that of an interested and appreciative spectator than of a prisoner on trial for her life.

Through many visits to the patient during the past two years and free access to the records of the Taunton Insane Hospital where she is confined, we have been able to follow her case, which has undergone a striking development, as will be seen.

On her admission she talked freely about herself to the hospital physicians and, although she showed her inborn tendency to deceit and falsification in many ways, the fact that she had no longer anything to gain by misleading others with regard to her mental condition gives a certain weight to the most consistently maintained of her statements. She reluctantly acknowledged, as she does to-day, that she poisoned 31 patients. She would not say that she was not insane but wished to know what her insanity consisted of. "I don't appear like these other patients. I can read a book intelligently, I don't have bad thoughts, so I don't see where moral degeneracy comes in." When asked if she had noticed any change in disposition in recent years she said, "No; I feel absolutely the same as I always was. I might say I feel hilarious, but that may express it too strongly." As to the feeling of fear, she replied, "As far as I have any knowledge of that feeling, I never showed it. I cannot recall any time that I was frightened. I used to be the wonder of my mother. I have never felt it throughout this affair." She has certainly never been affected except pleas-

urably by sudden explosions or threats of patients on the wards from the first.

During the first year of her life at the hospital she was, as a rule, sociable, quiet, cheerful, amiable and spasmodically helpful, and spent much of her time in reading. The change from the seclusion of the jail to the more active life of a large hospital ward interested her, and the air of discipline was effective in temporarily repressing her tendencies. In this period she grew fat, was in excellent physical condition, and wrote her sister: "Just think, I've been here a year and find myself fond of the people and warmly attached to the place in some ways. Yes, we are well cared for, kindly and considerately." She soon developed a fondness for the company of the patients, especially the most demented, in preference to that of the nurses.

The following statement by Dr. J. P. Brown, the Medical Superintendent, is the hospital record of April 22, 1903, about a year from the time of her commitment. It practically represents the opinion of the entire medical staff as to her condition at that time:

"My study and observation of J. T. since she has been in the hospital gives me the opinion that her mental disease should be classed as moral or affective insanity. She seems to me to be wholly devoid of moral sense, or a clear apprehension of what is right or wrong as to her relations to other people or to society. In all my conversations with her respecting the homicides, which she freely admits, she has expressed no remorse, regret or sorrow for any of them, but rather a sense of pride and satisfaction that the number was so large as to give her distinction above all other poisoners whose histories are known.

"This lack of pity and sorrow for others in trouble or distress has been evident whenever any difficulty has occurred on the ward between patients, or between a nurse and patients. At such times she has manifested a good deal of glee, and laughed like a silly child, but never has expressed any sympathy or pity for the patient or person in distress or trouble. Trouble or pain for others seems to excite in her merriment and joy instead of sorrow.

"In her association with other patients she has exhibited a special fondness for the demented, and especially for one who has openly practiced self-abuse; and once she got into bed with her after the patient had been put to bed for the night.

"In speaking of the homicides, she says that at the time she committed them she was not conscious of committing any crime or doing any wrong for which she should justly be punished; that the thought of doing wrong did not enter her mind, and gave her no concern whatever; and at the present time she apparently has no comprehension that the decree of the

court in committing her to the hospital was right and just, and must be obeyed; and she asks for her freedom as though it could be granted on the same basis as that of any other patient.

"Recently, during the past three or four months, she has seemed more moody and emotional, either depressed or exhilarated at short intervals, and has exhibited less self-control, and with it she gives one the impression that her mind is weakening, and that she has less mental grasp of past and present events, and of her relation to her surroundings. Of this she seems to be painfully conscious herself. She has been observed to be laughing immoderately to herself, and when it is noticed by others she blushes as though she would conceal it, and seems confused.

"This weakening of her mind as time goes on is what is to be expected, and will probably continue. In every case of moral or affective insanity there must be more or less impairment of what are called the intellectual faculties in distinction from the moral, especially reason, and judgment to decide ethical questions presented to the mind, otherwise the moral obliquity and perversion would be controlled, and the criminal act averted.

"From my examination and observation of her since she has been under my care, and my knowledge of her previous history as made known to the court before her sentence, I am of the opinion that she is insane and irresponsible, and that her mental disease resulting as it probably does from ancestral vice and degeneracy, which her family history so far as known clearly indicates, is incurable."

Even at this time an undercurrent of suspicious thought came to the surface in doubts of the intentions of people toward her. She even wrote her sister in Chicago, "Sometimes it strikes me you are one of the gang. If you have fooled me also I shall say d—n. Oh d—n anyway."

Her indifference to the character of her surroundings, from the first, her frivolous talk, contradictory sentiments, frequent, causeless laughter, open pleasure at the trouble of others, glee at situations of obvious personal discomfort to herself, and general and utter lack of more than occasional seriousness at her situation, present and future, or actions in the past, show most plainly a dominant tone of mental weakness such as is only to be found in the imbecile. This is well shown by extracts from her letters: "I've had a real good time in the sewing-room for the past two days. I never can say that I like to do a thing until I get some fun out of it, and I really had quite a lot of fun. I suppose it has been here [in me] ever since I have been here, but I haven't seen it. . . . . Truly, I had a great, good time at the Barnstable jail after the first ten days, even then I did not have a bad time." June 28, 1903, referring to an incident when on a visit to a friend: "It has left me rolling on the floor [with laughter]. I begin to feel like rolling on the floor now. I like to feel that way. I am having a big time, big" [in the sewing room]. March 8: "Don't ever ask me in your letters what I mean by what I write, I don't know myself—I'm talking through my hat. Nellie told me once that you said I

made you dizzy when I got to talking and laughing. I laugh now, Mary. I nearly bust myself laughing this past week. I don't like the locality I live in either." July 8, 1903, after greatly disturbing the ward at night with a violent fit of screaming for no obvious cause: "I meditate and praise and pray all the time, and shall be ready at the end to take vows and become Mother Honora of the Seven Wounds." In one of her thoughtful moods she writes, "I do grieve to be in this state, I do, when I have thought force enough to think it out. When I am discontented I ask myself what I want and I don't know. A change of any kind seems torture to me even to think of and why I want to live this way I don't know. . . . . Never mind, Mary, the fact remains that I have had a bully time in life in spite of everything." "I never feel that I am having a real good time when I'm behaving." Oct. 4: "I am still furnishing material for the drama of the 'unpopular lady.' I do wish I could behave myself for it all tires me so now, but I shan't probably till my last breath."

By December, 1903, she had become generally antagonistic toward all about her, as well as highly suspicious and irritable. She wrote voluminous tirades against the hospital and its management, treatment of patients, etc., making wholesale and absurd accusations and denunciations, some of an entirely delusional nature. She writes her sister, for example: "Do you know, the supervisor put some poison in my tea. A patient saw her and told me and I didn't touch it. The lady heard the supervisor say she had fixed J. T. this time." Apropos of special diet offered her she writes, "No, I thank you, Dr. Brown, I will stick to bean soup and keep safe above ground and out of Dr. Miller's [the pathologist's] hands. Some steak strikes some people right. This steak is sure death." Again, in a letter to her former counsel, she speaks of him as one of the "gang" who is managing her case, all the physicians and nurses of the hospital being included. She continued to write in this strain although told that such letters would no longer be forwarded. Dr. Brown also reports the following statement made to him by the patient: "I don't wish to associate with the low and vulgar people that are employed in the sewing room. They talked about me before the other patients in a low and vulgar manner." She then described a revolting scene, impossible on its face, as enacted by the two employees in charge, self-respecting, modest women, and gave a circumstantial account of talk and actions on their part of the vilest kind, in a manner highly suggestive of delusions of persecution and hallucinations of hearing. At this time, also, she is reported to have grown very neglectful of her personal appearance, even having to be told to wash her face. She had become very abusive to the nurses, defying their authority and inciting patients to do the same, going so far as to shout to a melancholic whom the nurse was trying to feed, not to eat the food as it was poison. Her physical condition had fallen off greatly. She had lost fifty pounds in weight in a few months, in consequence of her refusal of food because of false belief in regard to it. Owing to her weak condition she was removed to the infirmary. There she became more disturbed as well as destructive and

dirty in habits, enraged and somewhat violent, threatening to kill her nurses, etc. By February, 1904, she was greatly emaciated, having lost over eighty pounds, or about half her normal weight, and was so weak that forced feeding with the tube was resorted to for several days, since which time she has eaten voluntarily, but just enough to avoid being fed again. The artificial feeding was employed only after persistent persuasion and every possible measure to induce her to eat had been tried, including special articles of diet from the superintendent's table. A thorough physical examination revealed no evidence of bodily disease.

On a recent visit, March, 1904, she was found by the writer in good spirits, talking volubly and aimlessly at the nurses. She began at once on a tirade against the hospital, its officers and all its belongings. She insisted that everything was "rotten," that the meat was "embalmed" beef, etc., etc. She persisted in these complaints after being told that we had just eaten some of the dinner provided for her which we found nutritious and palatable. Everything was filthy, she said, even the brick walls which must be "saturated with the filth of years"; the water supply (which is taken from an artesian well) was "polluted with sewage"; the vegetables were "rank poison." She spoke rather anxiously about a general feeling of numbness, and asked what was the cause of it. She was entirely inaccessible to explanation, argument, or even positive proof as to the impossibility of her statements. Occasionally she would burst out unexpectedly with peculiar and piercing shrieks of laughter which would seem impossible to one in her weak condition.

Many of her indiscriminate and senseless charges seemed to be rather the expression of an insane malignity toward everyone than the outcome of genuine belief that they were true. But we were, at the same time, convinced beyond a doubt that she was also suffering from strong and genuine delusions of persecution by poisoning, because her belief in this regard so consistently influenced her conduct that her refusal of food had practically reduced her to a skeleton, and repeated, forcible feedings had no effect in changing her convictions. Her persecutory ideas vary in strength from time to time, but the delusions of suspicion from which they spring remain unshaken. The following letters evidently coming from the heart, are characteristic of delusional insanity;

"MARCH 15, 1904.

Dear ——: I am the victim of nerve paralysis, the result of food. I have to eat or I am fed with a tube with nerve-paralyzing food that I choose from the tray. Oh, I think that you and —— were criminals to put me through this. It was an awful thing to do to any human being and I have my opinion of everybody who takes a hand in it. I think it has been a most noble (?) piece of work. I think as the nerves of my body get more benumbed my brain becomes clearer to the outrageous course that has been taken with me. I suppose the next thing, something will be given to put me out of the way altogether. That would be a mercy to this

J —— T ——."

FIG. 1.

FIG. 2.

FIGS. 1 AND 2.—Appearance during first year at the hospital.

FIG. 3.

FIG. 4.

FIGS. 3 AND 4.—Appearance during second year at the hospital, after a period of refusal of food due to delusions of poisoning.

"TAUNTON LUNATIC HOSPITAL, July 4, 1904.

DOCTOR STEDMAN: I wish to inform you that I am alive in spite of the deleterious food which has been served to me. Many efforts have been made to poison me in this institution of that I am very sure. I am thin and very hungry all the time. Every nerve is calling for food. Why can't I have help? I ate a pint of ice cream and four oranges Saturday and Sunday. That was all. J —— T ——.

NORAH KELLEY."

It is worthy of note that, as would be expected in an insanity of the hereditary-degeneration group, the mental deterioration takes in this case the form of delusion rather than dementia.

In this after-history we find, brought into bold relief, the inherent, underlying defect of weakmindedness which was noted, but only obscurely seen earlier, for want of opportunity for proper observation, and also the outgrowth therefrom of pronounced intellectual change in the shape of positive delusions. These, together with the other and characteristic manifestations, afford the strongest confirmation of the patient's insanity, intellectual and moral.

The development of a delusional state in the course of moral insanity is, apparently, not uncommon, and affords another and strong argument for the contention that intellectual involvement in some form is an essential feature of the disease, or, in other words, that there is no such thing as a mental disorder affecting the moral sphere alone. Delusions are reported as occurring late in the disease, if at all, suggesting a secondary condition or stage. Comparatively few descriptions of moral insanity include this feature, perhaps because the few cases that reach the hospital for the insane either are not closely observed late in the disorder or, if followed up, are not recorded, and thus the picture of the entire disease-process, so to speak, as revealed in a certain proportion of cases is left unfinished. Another and, to our mind, weighty reason is that most of the morally insane are sent to prison where they rarely come under the observation of alienists. When their insanity has fully and unmistakably developed they are perhaps transferred to institutions for the chronic or criminal insane, where they pass for cases of chronic delusional insanity or dementia. That this view is not overdrawn is plain, even from Lombroso's[7]

[7] Op. cit., vol. ii, pp. 20-26.

accounts of the history of a number of prisoners of this class with reference to their intelligence, in some of whom delusions of suspicion and persecution are noted and in others a decided paranoiac tendency is evident. Schüle[8] says of them, "they may develop neuroses, somnambulism, periodical insanity, hypochondria." Dagonet[9] even finds acute delirious mania and hallucinations in the course of the disease. Arnaud[10] concludes a recent and instructive chapter on moral insanity with an account of a typical case with a late manifestation of "delusions of persecution more or less systematized and hypochondriacal ideas." In the opinion of the distinguished and practical psychiatrist, Hack Tuke,[11] there can be no doubt that in a number of cases of seeming moral insanity there develop *in course of time* definite delusions, especially of suspicion." According to Folsom,[12] "it is the rule that their doubts, imaginations and suspicions deepen into active insane delusions, their mental impairment advances to noticeable dementia, their moral deterioration goes on to such a degree of depravity that everybody wonders why they had not been seen to be insane long ago, and they are secluded in an asylum or elsewhere."

Further research in this direction can hardly fail to enlarge our knowledge of this intricate disorder and its affiliation with paranoia.

The striking parallelism between this and the once famous case of Christiana Edmunds, who was pronounced to be insane by Maudsley and several other distinguished alienists, is sufficient excuse for referring to it here. The extract is taken from an account of the case[13] quoted by Blandford and cited as typical of moral insanity:

"Christiana Edmunds is an example of a person *utterly devoid of moral sense or moral feeling* in matters relating to herself, though theoretically she doubtless knew that murder was a wrong thing. That she knew perfectly well what she was doing, in purchasing poison and disseminating it broadcast through the town

[8] Geist. Krankheit (1881).
[9] La Folie Morale, 1878.
[10] Ballet: Pathologie Mentale (1903)), p. 652.
[11] Dict. Psychol. Med., p. 814.
[12] Mental Diseases, Boston, 1886, p. 144.
[13] Blandford: Insanity and its Treatment. 3d ed., p. 228.

by means of poisoned chocolate creams and that she *knew she was therein doing wrong* were equally beyond dispute. Her whole conduct before the crime, and her *perfectly rational conversation* in jail, clearly proved she could have taught a schoolroom of children in the Ten Commandments, and explain to them clearly that it was a wicked act to break any of them, and a most wicked act to break the Sixth Commandment. But no one could have talked with her in jail without being convinced that in her own case she had *no real feeling of the wicked nature of her acts,* and that she would have poisoned a whole city-full of people *without hesitation, compunction, or remorse.* Indeed, it may be doubted whether in her later experiments she was really so much influenced by the *inadequate motive,* which no doubt instigated them at the beginning, as by *a morbid pleasure in poisoning for its own sake,* and in the sensation which her secret crimes excited. The terrible story of *insanity in her family* furnished the real explanation of her state of mind; she had the heritage of the insane temperament."

Dr. Orange, the Superintendent of Broadmoor, under whose care Christiana Edmunds has been ever since her trial, says, " that she has been *regarded as of unsound mind by all the medical officers of the asylum* who have been here during the last five years. She is at present fairly tranquil, and her conduct is much better than formerly; but I do not regard her as being sane, or fit to be trusted to keep out of mischief. She formerly had *periods of depression alternating with periods of subacute mania,* but latterly her condition has been more equable." [14]

[14] The italics are ours. H. R. S.

SOME METABOLISM STUDIES.

WITH SPECIAL REFERENCE TO MENTAL DISORDERS.

By OTTO FOLIN, Ph. D.,

With the cooperation of PHILIP SHAFFER, B. A., and more recently with the assistance of L. A. HILL, B. A.

(*Continued from Vol. LX, p. 732.*)

Table No. 8 gives the averages of the urinary constituents obtained from seven normal persons, each of whom was kept on the liquid laboratory diet for one week. At the bottom of the table is given the final average of all, i. e., the average of thirty-five 24-hour quantities of urine. The comparative uniformity in the various ratios and percentages shown by these normal urines should again be noted here. Any striking deviations outside the limits set by these control persons obtained from similar feeding experiments with patients are held to indicate the presence of one or another form of abnormal metabolism. The validity of such a conclusion depends of course upon the accuracy with which the seven control persons represent the normal variations.

Experiments with Patients.

On the following pages will be presented analytical material obtained by similar studies on patients. The original intention was not to publish these investigations until a fairly large number of cases corresponding to each of the psychiatrical groups had been obtained, and then to arrange the results according to such a classification. But as the investigations have broadened in scope and the analyses have become more complete, the earlier cases, less fully covered by the analytical work, can no longer be used to advantage in connection with the later, more completely studied cases. For this reason and also on account of the fact that the investigations have so far failed to show any characteristic metabolism peculiarities corresponding to the different psychiatrical

groups of cases, it has seemed best to arrange the tables largely in accordance with the analytical results alone. One important exception is, however, made in regard to the cases of general paralysis. This comparatively well defined disease has yielded the most interesting results and the cases representing general paralysis are therefore given first and consecutively.

Tables 9-12 represent an unusually prolonged series of feeding experiments carried out with a patient suffering from general paralysis.

"H. C. C. Age 49. Physical condition: decidedly undernourished. In all three periods marked diarrhœa, about the same in the three. Diagnosis: general paralysis. Physical signs: marked speech defect. Unsteadiness of gait. Knee-jerks exaggerated. Argyll-Robertson pupil. Mental state: dull, marked memory defect, especially for recent events. Inability to apply mind. Indifference. In other words, a case of simple dementia without active symptoms. It is always difficult to say whether a general paretic of this type is in an active process, but looking back over four months the patient has deteriorated very much both mentally and so far as his speech and gait are concerned, but there is no reason to think that the process was not of the same intensity in the three periods."—H.

The low absolute amounts of total nitrogen, as well as of other urinary constituents recorded in table 9, must be accounted for by the marked diarrhœa with which the patient was troubled during this experiment. At first it was thought that this fact was also the cause of the striking deviations from the normal in the various relationships among the urinary constituents, although it did not seem clear why diarrhœa should lead to such a tremendous increase in the elimination of ammonia, or why the nitrogen-phosphate ratio should sink from the normal figure 24 to 17 while the nitrogen-chloride ratio remained normal.

Thinking that the diarrhœa was only temporary, we intended to repeat the experiment later in the season, but as it continued and did not show any signs of abating or of yielding to the drugs administered, we took up the patient again a week later. This time the patient was kept on the laboratory diet for eleven days, giving us nine 24-hour quantities of urine, the analyses of which are recorded in table 10.

(It will be noted that in this case, as in several others, the night urines and the day urines from three or four successive days have been combined and analyzed separately. This was done in order to learn whether the day urines and the night urines were noticeably different.)

No. 8. Averages of Tables 1–7.

1903.	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, grms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, grms.	Uric acid, grm.	Acidity.		Indican.	Ratios.						Per cent of total N_2.				
															100 N_2 :			100 SO_3 :							
												Mineral.	Organic.		P_2O_5.	SO_3.	Cl_2.	P_2O_5.	Ethereal SO_3.	Neutral SO_3.	Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated.									Sum				
Huwyler.	1645	3.44	3.08	6.9	.188	.159	15.1	28.93 13.5	392 .55	1.36 .504	.402 .154	604 247	 359	12	22	20.4	46.6	112	6	5	89.4 93	3.6	3.3	1	2.7
Brown.	1239	4.5	3.65	6.08	.29	.215	18.24	34.71 16.2	433 .603	1.58 .59	.438 .146	651 273	 378	105	24.6	20	33.4	123	8	6.1	88.84 92.16	3.32	3.23	.83	3.66
Bogart.	1812	3.69	3.25	6.28	.19	.165	16.6	30.64 14.3	608 .85	1.57 .59	.33 .11	554 204	 360	50	22.3	19.5	37.9	114	5.5	4.9	87.50 92.60	5.1	3.6	.68	3.1
Scott.	1196	3.82	2.93	5.91	.253	.18	14.8	27.34 12.26	492 .650	1.46 .54	....	669 417	 252	86	25.5	19.8	39.9	131	8.6	6.2	86.30 91	4.7	3.66	.54	5.0
Jones.	1444	3.90	3.00	5.72	.245	.16	16.4	30.32 14.15	529 .741	1.57 .59	.314 .105	621 308	 313	140	23.7	19.3	34.9	123	7.7	5.2	86.20 90.7	4.5	3.5	.63	5.3
Campbell.	1242	3.96	2.95	5.6	.194	.125	14.9	27.42 12.84	549 .77	1.77 .66	.438 .146	661 375	 284	70	26.6	20	37.2	134.6	6.5	4.5	86.7 91.7	5.0	4.5	.98	2.8
Dr. P.	1394	3.76	3.03	5.49	....	....	15.94	29.78 13.90	402 .77	. .. .	.382 .127	664	.. ....	42	23.6	19	34.9	124	....	....	87.36 90.9	3.54	....	.82	....
Average	1425	3.87	3.13	6.00	.227	.167	16	29.74 13.88	486 .68	1.55 .57	.393 .131	623 305	 324	72	24	19.7	37.8	123	7.1	5.3	87.46 91.7	4.24	3.63	.78	3.75

No. 9. Name, Mr. H. C. C. { Weight May 28, 49.700 k. / " June 4, 49.600 k. / Loss ..... 100 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	100 N_2: SO_3.	100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	100 SO_3: Ethereal SO_3.	100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
April	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated.										Sum				
28	21 615	100 1.23	113.6 1.40	55.7 3.43	14 .170	2.6 .032	61.6 7.57	10.69 4.99	1124 1.57	.824 .306	.167 .055	241 .84	 324	8	16.2	19	45.3	88	12	....	66.	20.8	4	.3	8.9
29	21 755	112 1.69	114 1.72	55 4.18	16 .241	8 .121	62.7 9.47	13.90 6.48	1374 1.92	1.06 .394	.293 .097	332 −130	 462	40	17.9	18.1	44	98	14	7	68.4 (86.8)	20.3	4.1	1	6.2
30	20 770	108 1.64	116 1.78	52 4.00	17.8 .275	10.4 .160	63.4 9.76	14.59 6.81	1322 1.85	1.06 .395	.143 .047	277 −117	 395	40	16.8	18.2	41	92	15.5	9	69.94 (88.7)	19	4.05	.49	6.7
May 1	22 790	102 1.61	115 1.81	48 3.79	17.7 .279	12.6 .190	66.5 10.5	16.71 7.80	1122 1.57	1.027 .384	.260 .087	284 12.6	... 271	40	15.3	17.2	36	89	15.4	10.6	74.25 (88.74)	15	3.64	.85	6.3
2 3 Days	22.5 1420	122 3.45	129 3.68	40 5.64	17.8 .505	2.3 .062	70 19.9	32.51 15.17	2044 2.86	1.69 .628	.241 .080	539 0	 539	80	17.3	18.6	28	93.8	13.8	....	76.1 (89.25)	14.2	3.2	.4	6.1
4 Nights	20 980	120 2.35	123 2.40	....	17 .334	....	66 12.9	21.25 9.92	1372 1.92	1.12 .416	.147 .049	352 −58	 410	..	18.2	1855	..	97.9	13.5	....	76.7 (90.3)	14.8	3.2	.38	4.9
																					(91.5)				
Average	760	1.71	1.827	3.85	.258	.157	10.01	15.66 7.31	.194 1.67	.97 .36	.207 .069	289 −54	 343	35	17	18.3	38.5	94	14.1	8.6	73.1 (89.8)	16.7	3.6	.7	5.9

No. 10. Name, MR. H. C. C.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
May	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
14	105 1850	38.5 1.42	34.3 1.27	30 5.55	7.9 .284	7.7 .280	16.1 5.96	8.29 3.87	755 1.06	.685 .254	248 .083	185 −266	 451	30	23.9	21.3	93.1	111.3	22.3	22	64.87	17.74	4.2	1.4	1.8
15	12 3075	50 3.07	37.8 2.33	33 10.27	3.8 .237	6.6 .405	17.5 10.76	17.14 8	1230 1.72	1.2 .445	.452 .151	443 −123	... 566	40	28.6	21.6	95.5	13.2	10.2	17.3	82.6 74.4	16	5.8	1.4	2.4
16	14 1300	85 2.21	52 1.35	38 4.89	8.9 .233	10.8 .281	25 6.44	10.07 4.7	754 1.06	.719 .267	.325 .108	270 −42	 312	30	29.1	20.9	76	135.6	17.3	20.8	90.4 73.2	16.4	4.1	1.66	4.6
17	12 1525	82 2.50	45.5 1.39	35 5.31	4.4 .134	8 .244	24 7.29	11.39 5.31	872 1.22	.7 .28	.257 .082	262 43	 219	100	34.3	19.1	72.8	180	9.6	17.6	89.6 72.8	16.7	3.8	1.1	5.6
18	12 2100	80 3.36	53.5 2.25	32 6.70	5.9 .250	12.5 .525	27 11.23	17.27 8.06	1302 1.83	1.01 .376	.449 .149	369 92	 277	100	30	20.	59.7	150	11.1	23.3	89.5 71.8	16.2	3.1	1.33	7.5
19 20 Days	 2660	90 4.79	58.4 3.11	38 10.19	9.6 .511	7 .372	33 17.5	26.40 12.32	2043 2.86	1.86 .692	.736 .245	468 0	 468	100	27.9	18.9	58	155	16.4	12	88 70.2	16.2	3.9	1.4	8.3
21 22 Nights	 2950	97.5 5.75	68.8 4.06	35 10.26	8.5 .498	8.6 5.07	35 20.73	31.76 14.82	2454 3.44	1.74 .647	.664 .221	507 −377	 885	200	27.7	19.5	50	142	12.2	12.4	86.4 71.5	16.6	3.1	1.1	7.7
Average	1718	2.58	1.75	5.91	.238	.290	8.88	13.59 6.34	1046 1.46	.79 .293	.345 .115	278 −75	 353	67	29.05	19.7	66	147	13.6	166	88.1 71.7	16.4 88.1	3.3	1.3	7.3

No. 11. Name, Mr. H. C. C.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2 : P_2O_5.	Ratios. 100 N_2 : SO_3.	Ratios. 100 N_2 : Cl_2.	Ratios. 100 SO_3 : P_2O_5.	Ratios. 100 SO_3 : Ethereal SO_3.	Ratios. 100 SO_3 : Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
May	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated.										Sum				
25	17 1260	120 3.02	76 1.78	31.2 3.93	6.1 .155	19.3 .494	39.2 9.88	15.36 7.18	1048 1.47	.806 .3	.415 .138	378 70	 308	100	30.6	18	40	170	8.7	27.7	72.7	14.8	3	1.4	8.2
26	20 905	131 2.37	94.8 1.72	43.3 3.92	9.5 .172	14 .267	46 8.33	13.27 6.19	879 1.23	.751 .28	.342 .114	340 −29	 369	170	28.4	20.6	47	138	10	15.5	72.43	14.8	3.3	1.3	6.3
27	20 970	137.5 2.67	109 2.12	40 3.89	9 .175	7.5 .145	5 9.95	15.66 7.31	1032 1.44	.776 .288	.382 .127	365 128	 237	200	26.8	21.3	39	126	8.2	6.8	73.51	14.5	2.9	1.3	7.8
Average	1045	2.69	1.87	3.91	.167	.302	9.39	14.77 6.89	986 1.38	.778 .289	.380 .127	361 56	 305	150	28.6	19.9	41.6	144	8.9	16.1	73.37	14.7	3.07	1.3	7.56

(903)

No. 12. Name, Mr. H. C. C.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, grms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, grms.	Uric acid, grm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2 : P_2O_5.	Ratios. 100 N_2 : SO_3.	Ratios. 100 N_2 : Cl_2.	Ratios. 100 SO_3 : P_2O_5.	Ratios. 100 SO_3 : Ethereal SO_3.	Ratios. 100 SO_3 : Neutral SO_3.	Per cent of total N_2. Urea.	Per cent of total N_2. NH_3.	Per cent of total N_2. Kreatinin.	Per cent of total N_2. Uric acid.	Per cent of total N_2. Rest.
July	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated.										Sum				
29	20 870	153 2.65	133 2.32	33.4 3.00	15.6 .271	....	57 9.91	.... 8.26	465 .65	.925 .34	.330 .110	372 348	 24	80	26.7	23.4	30.3	114	11.6	....	83.32	6.6	3.43	1.1	5.55
30	13 1450	79 2.29	68.5 1.99	27.7 4.01	8.6 .248	3.5 .101	34 9.94	....	580 .812	.725 .27	.255 .085	360 313	 47	90	23	20	40.3	115	12.4	5.08	89.92 .. .	8.17	2.73	.86	6.25
31	15 1560	88 2.73	67.7 2.11	28.4 4.43	9 .281	4.9 .153	34.3 10.70	....	998 1.397	.748 .28	.273 .091	343	....	100	25.5	19.7	41.4	129	13.3	7.25	90.16	....	2.6	.85	5.1
August 1	14 1625	93.5 3.04	63 2.05	32.7 5.31	5.6 .182	7.4 .241	32 10.4	....	1235 1.73	.62 .23	.307 .102	... .	....	20	29.2	19.7	51	148	8.9	11.7	91.42 ...	....	2.2	.98	5.1
2	16 1540	89 2.72	75 2.31	35.5 5.47	15.3 .471	6.8 .209	38.4 11.83	....	494 .69	.83 .29	.308 .103	308 283	 25	70	23.3	19.5	46.2	118	....	9.05	91.74 86.74	5.8	2.45	.87	4.14
3	15 1285	90 2.30	74.2 1.91	29.8 3.83	10.1 .260	4.8 .123	37 9.50	....	329 .46	.64 .24	.206 .069	180 447	.... −267	20	24.2	20.1	40.3	120	13.6	6.4	92.54 87.4	4.84	2.53	.72	4.5
4	12.5 1875	74 2.76	56 2.09	29.1 5.45	7.5 .281	2.5 .094	29.3 10.99	....	975 1.365	.78 .29	.257 .086	281 0	 281	20	25.1	19.1	49.5	132	13.4	4.5	92.24	....	2.64	.78	3.3
5	17 1380	100 2.76	73.2 2.02	39.8 5.40	10.5 .290	4.2 .116	37.7 10.41	....	607 .85	.75 .28	.247 .082	386 280	 106	90	26.5	19.4	52.7	136	14.3	5.7	93.3 81.9	8.1	2.7	.76	6.54
6	16.5 1390	103 2.85	75.2 2.09	29.8 4.14	11.6 .322	8 .222	39.6 11.00	....	700 .98	.75 .28	.278 .093	378 111	 267	50	25.9	19	37.6	136	15.4	10.6	90	8.9	2.54	.85	6.14
																					90.47				
Average	1440	2.68	2.10	4.57	.289	.157	10.52	....	687 .96	.75 .28	.273 .091	290	....	60	25.48	19.96	43.6	127.6	13.8	7.5	....	....	2.66	.87	5.16
																					91.31				

No. 13. Name, MR. H. H. V. { Weight, Nov. 4.....64.750 k. " " 8..... " Loss..... 0

2 k. Liquid food and 900 cc. water.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
Nov.	cc. in 24°	Total	Total	Total	Total	Total	Total	N_2	N_2	N_2	N_2	Titrated.									Sum				
4	19 1880	106.5 4.00	91.4 3.43	36.2 6.81	9.9 .372	6.6 .24	52.6 19.77	37.26 17.39	587 .822	1.523 .553	.413 .138	714. 308	 406	20	20.3	17.4	34.4	117.7	10.8	7	87.8 92 91.1	4.2	2.8	.7	4.5
5	29 1150	169. 3.89	157.1 3.61	47.57 5.47	18.1 .416	8.3 .190	82.46 18.97	35.23 16.44	511 .715	1.414 .523	.397 .132	699. 345	 354	140	20.5	19	28.8	107.7	11.5	5.3	86.7 92 90.5	3.8	2.75	.7	6.05
6	27 1315	145.5 3.83	134.2 3.51	50.4 6.63	17.6 .461	6.1 .20	73.5 19.33	35.70 16.66	589 .825	1.510 .560	.365 .122	710. 289	... 421	220	20.3	18.2	34.3	108.8	13.1	5.7	86.2 90.5 90.5	4.3	2.9	.63	5.97
7	17 1890	102.5 3.87	90.5 3.42	33.3 6.30	11.9 .449	6.9 .210	48.6 18.37	33.73 15.74	703 .984	1.277 .470	.312 .104	748. 332	 416	100	21.1	18.6	34.3	110.2	13.1	6.1	85.8 91.1 91.6	5.3	2.6	.57	5.73
8	20 1680	114 3.83	106.9 3.59	38 6.38	12.5 .418	4.1 .240	56.7 19.05	35.59 16.61	598 .837	1.700 .630	.473 .158	672. 262	 410	100	20.0	18.8	33.5	106.7	11.7	6.7	87.2	4.4	3.3	.83	4.27
Average	22.4 1583	3.88	3.51	6.32	.423	.22	19.1	35.51 16.37	598 .837	1.485 .547	.392 .131	709. 308	 401	116	20.4	18.8	33.1	110.2	12	6.2	86.74 91.14	4.4	2.9	.68	5.4

No. 14. Name, MR. W. { Weight, Nov. 11.....85.300 k. " " 15.....84.900 k. Loss ..... 400 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity.		Indican.	Ratios.						Per cent of total N_2.				
															100 N_2 :			100 SO_3 :							
												Mineral.	Organic.		P_2O_5.	SO_3.	Cl_2.	P_2O_5.	Ethereal SO_3.	Neutral SO_3.	Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
Nov.	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated.									Sum				
11	23 1555	152.5 4.74	118 3.67	42.6 6.62	7.8 .242	7.8 .242	68.6 21.33	39.71 18.53	448 .627	1.98 .73	.630 .210	740 305	 435	120	22.2	17.2	31	129.2	6.6	6.6	86.8 3 / 89.8	3.4	.48	5.8
12	29 1180	184 4.34	147 3.47	46.2 5.45	9.4 .221	6.6 .155	77.84 18.37	34.24 15.98	429 .601	1.723 .64	.615 .205	731 283	 448	100	23.7	18.9	29.7	125	6.4	4.5	86.84 3.26 / 90.1	3.5	1.1	5.3
13	29.5 1250	17.5 4.37	148.6 3.72	54.7 6.84	8.6 .215	6.2 .16	77.84 19.45	36.60 17.08	410 .574	2 .74	.762 .254	720 275	 445	100	21.9	19.1	34.6	117.6	5.8	4.3	87.85 2.95 / 90.8	3.8	1.3	4.1
14	33 880	217.5 3.83	183.4 3.23	49 4.31	12.5 .221	8 .141	92.68 16.31	30.11 14.05	447 .626	1.522 .56	.323 .108	686 285	 401	100	23.5	19.8	26.5	118.6	6.9	4.4	86.15 3.85 / 90	3.45	.66	5.89
15	29 1250	170 4.25	143.9 3.60	58.2 7.27	10.4 .260	7.5 .163	81.62 20.4	38.42 17.93	445 .623	1.82 .67	.638 .213	750 365	 385	110	20.8	17.6	35.6	118	7.2	4.5	88.4 3 / 91.4	3.15	1.04	4.67
Average	**1223**	**4.31**	**3.54**	**6.01**	**.232**	**.172**	**19.17**	**35.81** **16.71**	**436** **.610**	**1.81** **.668**	**.592** **.118**	**725** **302**	.... **423**	**106**	**2214**	**18.5**	**31.5**	**121.7**	**6.6**	**4.8**	**87.2 3.21** / **90.4**	**3.46**	**1.01**	**5.15**

No. 15. Name, MRS. M. { Weight, Oct. 9.....41.450 k.
" " 14.....41.0 k.
Loss..... .... 450 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2 : P_2O_5	Ratios. 100 N_2 : SO_3	Ratios. 100 N_2 : Cl_2	Ratios. 100 SO_3 : P_2O_5	Ratios. 100 SO_3 : Ethereal SO_3	Ratios. 100 SO_3 : Neutral SO_3	Per cent of total N_2. Urea	NH_3	Kreatinin.	Uric acid.	Rest.
October	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated.										Sum				
9	19.5	113	101.9	28.4	7.8	10.8	56.7	22.37	424	.901	.322	415	....	85	19.8	17.9	25	110	7.6	10.7	86.9	4.9	2.8	.9	4.5
	1060	2.38	2.16	3.01	.165	.23	12.02	10.44	594	.335	.107	216	199								91.8				
10	17	135	70.4	29.8	13.7	.4	39.9	20.18	425	.763	.305	375	....	100	21.2	17.6	37.3	120	9.7	5.7	86.5	5.4	2.6	.93	4.6
	1380	2.33	1.94	4.11	.189	.11	11.01	9.42	.595	.28	.102	187	188								91.9				
11	19	111	92.4	24.8	9.1	4.2	54.1	21.94	478	.824	.320	445	....	90	20.4	17.0	21.5	120	9.9	4.7	85.0	5.3	2.4	.85	6.45
	1160	2.57	2.14	2.88	.211	.10	12.57	10.24	.669	.306	107	....	....								90.3				
12	23	112	52	40.5	10.8	5.6	55.6	20.14	446	.77	.326	400	....	90	20	18.7	36.5	108	10.4	5.3	84.6	5.6	2.6	.98	6.2
	1000	2.23	2.08	4.05	.217	.11	11.12	9.40	.624	.286	.109	72	328								90.2				
13	21	90	94.3	36.9	10.1	5.5	52.1	19.16	480	.757	.284	347	....	85	17.3	17.3	35.5	95.5	10.7	5.7	85.0	6.4	2.7	.9	5
	1010	1.82	1.905	3.73	.204	.11	10.52	8.94	672	.28	.095	89	258								91.4				
14	22	104	93.1	41.9	11.3	5.2	52.6	19.16	448	.786	.311	368	....	100	18	18.1	40	108	11.8	5.3	85.0	6.0	2.76	.99	5.24
	1000	2.07	1.91	4.19	.225	.10	10.52	8.94	.627	.29	.104	104	264								91.0				
Average	**1100**	**2.23**	**2.02**	**3.66**	**.202**	**.127**	**11.29**	**20.48** 9.56	**450** .630	**.800** .296	**.311** .104	**391** 112	 279	**91.7**	**19.75**	**17.8**	**32.6**	**110**	**10**	**6.2**	**85.56** 91.1	**5.6**	**2.65**	**.93**	**5.33**

No. 16. Name, MR. W. FR. { Weight, Jan. 8.....56.600 k. " " 12.....57.800 k. Gain ..... 1.200 k.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, grms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	100 N_2: SO_3.	100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	100 SO_3: Ethereal SO_3.	100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
January	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
8	19 1245	117.5 2.93	98.1 2.44	35.5 4.42	7 .175	8.5 .214	52.5 13.07	25.01 11.67	344 .489	.996 .37	.229 .076	493 299	... 195	....	22.4	18.7	34	120.1	7.2	8.7	89.27	3.73	2.8	.6	3.6
																					93				
9	19 1820	112 4.08	91.1 3.32	32.66 5.83	5.7 .207	5.1 .186	49.28 17.94	35.15 16.04	451 .63	1.27 .47	.396 .132	677 364	 313	....	22.8	18.4	32.4	122.9	6.2	5.6	89.4	3.5	2.6	.7	3.8
																					92.9				
11	25 1710	170 5.83	138 4.72	30.53 5.22	7.3 .258	7.6 .260	71.68 24.51	45.17 21.08	879 1.23	1.54 .57	.658 .219	951 588	 363	....	23.8	19.3	21.3	126.8	5.5	5.5	86	5.00	2.4	.89	5.7
																					91				
12	20 1625	110 3.58	93.1 3.026	44.7 7.26	4.9 .160	4. .132	48.86 15.88	30.17 14.08	533 .75	1.71 .63	.335 .112	763 500	 263	....	22.5	19.0	45.6	118.1	5.3	4.4	88.7	4.7	3.9	.7	3.0
																					93.4				
Average	1600	4.10	3.38	5.68	.200	.198	17.85	15.72	553 .774	1.38 .51	.405 .135	721 438	 283	....	22.9	18.8	33.3	122	6.	6.	88.5	4.2	2.9	.7	4
																					92.7				

No. 17. Name, Mr. Ch. N. { Weight, Jan. 15.....70.600 k. " " 21..... " / Loss..... 0

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
January	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated.										Sum.				
15	37	199	208.8	51.1	19.5	7.4	106	26.62	389	1.096	.168	571	....	40	18.8	19.7	24.1	95.5	7.4	3.5	85.6	3.8	2.8	.38	7.4
	685	2.73	2.86	3.50	.260	.100	14.52	12.43	.545	.41	.056	195	376												
17	31.5	168	141	57.5	21.6	11	94.76	....	....	.911	.216	....	....	20	17.8	o. k. 15	30.5	119.5	15.4	7.4	89.4	....	2.6	.57	7
	675	2.27	1.90	3.87	.292	.140	12.73	....	....	.34	.072	....	....												
18	34	160	77.4	75.97	16.4	7.2	93.24	24.28	347	.99	.396	529	....	65	18.3	20.3	42.6	90.3	9.6	3.9	89.8 85.8	3.7	2.7	1	6.8
	755	2.42	2.68	5.63	.258	.107	13.21	11.33	.486	.36	.132	145	384												
19	35	170	179.9	76.68	18.2	8.9	88.76	23.74	456	1.076	.444	556	....	90	19.2	20.2	43.0	94.3	10.0	4.8	89.5 86.0	4.6	2.8	1.1	5.5
	775	2.635	2.79	5.94	.282	.136	13.76	11.83	.638	.39	.148	109	447												
21	25	152.5	171	81.65	20.3	7.2	86.8	....	....	1.176	....	....	....	40	17.7	19.8	47.4	89.0	11.8	4.2	90.6	....	2.8	....	....
	905	2.76	3.095	7.39	.366	.130	15.61	....	....	.435	....	....	....			19					89.3				
Average	760	2.56	2.66	5.66	.290	.120	13.96	11.80	397 .556	1.05 .386	.300 .100	552 150	402	51	18.4	19	37.5	97.7	10.8	4.8	85.8 89.7	4.4	2.8	.8	6.7

No. 18. Name, MR. W.—Weight about 48. k.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
July	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
18	25 1350	145 3.915	121.8 3.29	74.5 10.05	7.6 .205	15.8 .427	63.7 17.20	33.24 15.51	313 .437	.59 .22	.203 .067	724 421	 303	30	22.7	19.1	58.5	119	6.2	12.9	90.2	2.55	1.28	.39	5.6
19	23 1090	132 2.89	114.2 2.49	54.7 5.96	7.2 .157	10.8 .235	56.7 12.35	23.70 11.06	305 .427	.72 .267	.222 .074	510 327	 183	90	23.4	20.2	48.2	116	6.3	9.4	92.75 89.3	3.5	2.1	.6	4.5
20	15 1820	87.5 3.19	67.3 2.75	40.4 7.35	3.8 .138	3.5 .127	34.3 12.48	23.04 10.75	437 .612	.57 .21	.191 .064	566 400	 166	80	25.56	22.03	59	116	4.3	4.7	92.8 86.12	4.9	1.68	.5	6.8
21	16 1560	102 3.17	82 2.56	41.9 6.54	46 .145	6.7 .209	37.5 11.70	21.71 10.13	493 .696	.70 .261	.168 .056	561 100	 461	80	27.1	21.9	56	123	5.7	8.1	91.02 86.54	6	2.2	.5	4.76
22	15 2130	83.5 3.56	64.2 2.95	44.7 9.52	3.2 .136	10 426	31.9 13.59	25.56 11.93	416 .582	.81 .3	.230 .077	605 257	 348	75	26.1	21.7	70	121	4.6	14.4	92.54 87.8	4.3	2.2	.6	5.1
24	16 1770	93.5 3.31	78 2.75	36.9 6.53	5.7 .202	3.8 .135	37.9 13.41	25.69 11.99	347 .486	.828 .31	.176 .059	587 234	 353	..	24.66	20.4	48.7	120	7.3	4.9	92.1 89.39 92.99	3.6	2.3	.4	4.4
Average	**1620**	**3.34**	**2.80**	**7.66**	**.164**	**.260**	**13.46**	**25.46** **11.88**	**385** **.539**	**.70** **.26**	**.198** **.066**	**592** **290**	**302**	**71**	**24.8**	**20.8**	**57**	**119.3**	**5.8**	**8.5**	**88.26** **92.26**	**4**	**2**	**.5**	**5.2**

No. 19. Name, MR. T.

1902. 24° ending.	Sp. gr.	P_2O_5, mg. in 50	SO_3 mg. in 50	Cl_2 mg. in 50	N_2 mg. in 5	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Acidity Titrated	Ratios. 100 N_2: P_2O_5	Ratios. 100 N_2: SO_3	Ratios. 100 SO_3: P_2O_5	Per cent of total N_2 Urea.	Per cent of total N_2 NH_3
June	cc. in 24°	Total	Total	Total	Total		N. Total					Sum	
17	17 1470	167 4.91	108 3.17	....	51.1 15.02	....	452 .633	617	32.7	21.1	154.7	____ 6.2	
18	20 1080	150 3.24	125.5 2.71	....	64 13.84	....	471 .658	540	23.4	19.6	119.6	____ 4.7	
Aug. 13	22 1300	150 3.90	....	....	68 17.75	34.9	502 .703	724	22	....	....	88 ____ 4 92	
14	19 1450	125 3.62	....	....	58 16.88	33.8	522 .731	687	21.6	....	....	89.2 ____ 4.3 935	
15	18 1050	125 2.62	....	....	57.5 12.07	24.3	430 .602	493	21.74	....	....	89 ____ 5 94	
Average	**1270**	**3.64**	**2.94**	....	**15.11**	....	**475** **.665**	**612**	**24.3**	**20.3**	**137.1**	**88.7**	**4.8** **93.2**

No. 20. Name, MR. J.

1902. 24° ending	Sp. Gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg.	N_2, mg. in 5 cc.	Acidity. Titrated.	Ratios. 100 N_2: P_2O_5	Ratios. 100 N_2: SO_3	Ratios. 100 SO_3: P_2O_5
June	cc. in 24°.	Total	Total	Total	Total				
21	32 925	207.5 3.84	168.4 3.12	....	74.7 19.35	666	19.8	16.1	123.2
22	26.5 1190	125 2.93	112.5 2.68	....	66.5 15.83	658	18.5	16.8	109.2
Average	**30** **1060**	**3.38**	**2.90**	....	**17.59**	**660**	**19.1**	**16.5**	**116.2**

Although the diarrhœa during this experiment was just about the same as during the first period, the differences in the urines from these two feeding experiments are quite remarkable. The

daily 24-hour quantity of urine was more than twice as great during the second experiment as during the first, yet the amount of total nitrogen eliminated with the urine was a little less during the second experiment. The ammonia remained as during the first period extremely high, being nearly four times as great as the normal with reference to the total nitrogen. The nitrogen-phosphate ratio instead of being about the lowest observed in any patient, as during the first experiment, went to the other extreme in the second period, 29 as against 17. The nitrogen-chloride ratio also increased almost as much as the nitrogen-phosphate ratio, but this is not very unusual because we find frequently enough that the chloride excretion is considerably influenced by the volume of water eliminated (which is not the case with reference to the phosphate elimination).

A few other abnormalities must be noted in this patient: (1) The ethereal sulphates are fully twice as great as the normal as judged by the corresponding ratios, yet the indican is below the normal in the second period. (2) The "neutral" sulphur is but a trifle higher than the normal during the first period and is more than twice the normal during the second period. (3) The undetermined nitrogenous rest is enough above the normal to indicate the presence in it of some substance pathological either in kind or in amount. In a few of the urines a slight albumin reaction could be detected by means of trichloracetic acid, but this was not present in all and the reaction moreover was so slight as to exclude the possibility that the increase in the undetermined nitrogen was due to it. (4) In connection with the increase in the undetermined nitrogen it is to be noticed that the mineral acidity is either extremely low or is a minus quantity, i. e., is replaced by a mineral alkalinity, thus indicating that any pathological nitrogenous substance which might be present can not very well have basic properties. (5) The uric acid is practically normal with reference to the nitrogen during the first period (table 9) and is doubled in the second (table 10).

On account of the remarkable continuous excretion of ammonia it was decided to give the patient a moderate quantity of alkali and to study the effects. The second period was therefore continued for four more days, during which time about thirteen grams of sodium bicarbonate were given. During the first of these

days some urine was lost and the results of the next three days only are recorded (table 11). The results are again highly interesting, but in so far as the effect of the alkali is concerned it will be seen that the ammonia output is scarcely if at all affected. During this (third) period it will be seen that the volume of urine excreted has again become very small and with it we find a corresponding diminution of the chlorides. The phosphates are, however, not similarly affected and the nitrogen-phosphate ratio remains just about as high as during the second period. The ethereal sulphates have become nearly normal but the indican is now more than twice that of the second period, thus showing again that these two factors do not, as is frequently stated, go hand in hand as indicators of the amount of putrefaction that takes place in the intestines. The "neutral" sulphur remains high but very varying. The uric acid and the undetermined nitrogen remain as during the second period.

Two months later this patient was again taken for a feeding experiment of eleven days. The diarrhœa still remained about the same as during the preceding three periods, and this fact is indicated by the amount of nitrogen eliminated through the urine. From the records of table 12 it will be seen that the patient had at this time perceptibly recovered from the turbulent state of metabolism which prevailed during the first three feeding experiments. The ethereal sulphates are still considerably above the normal and the ammonia is high but is less than half of what it was during the earlier experiments.

It will be noted that three ammonia determinations are not recorded in table 12 and that the average has not been calculated. This is due to the fact that some of the urines obtained in this experiment were slightly decomposed when they reached the laboratory notwithstanding all the precautions taken to prevent this from occurring. The urines obtained in connection with our feeding experiments are collected in bottles containing a chloroform solution of thymol, and the ammonia determinations are always made first. Notwithstanding these precautions urines have been found occasionally which show ammoniacal decomposition. Contrary to what is generally supposed, some urines are decomposed in the sense of being turbid, and giving a strong odor peculiar to decomposed urines, and yet do not show any decomposition of urea into ammonia. (In such urines ammoniacal decomposition is, however, almost sure to begin a day or two later even in the presence of both chloroform and thymol.) Decomposi-

tion, resulting in an increase of the ammonia, is indicated by a lessened acidity as well as by an increase of the ammonia, and the presence of such ammoniacal putrefaction can always be demonstrated by making a second ammonia determination the following day. If any ammoniacal decomposition of the urine has begun, shaking or adding more preservative will not stop it and there will always be more or less of an increase of the ammonia shown the following day. Throughout these experiments the above mentioned precautions have been observed and the ammonia determinations of urines showing ammoniacal decomposition are either not recorded or are excluded in the calculation of the averages. In such cases the acidity determinations have also been left unrecorded.

The extreme variations noted in the preceding case of general paralysis, variations extending to almost every single urinary constituent included in the determinations, suggested the possibility that such seemingly capricious abnormalities may be characteristic of this fatal disease in one stage or another. The records of the other cases of general paralysis included in these studies are given in tables 13-20. They indicate that similar peculiarities are indeed to be found, at least to a much greater extent than is the case in normal persons or in the other patients.

H. H. V. (table No. 13).

"Age 42. Physical condition fair. Diagnosis: general paralysis. Physical signs: Argyll-Robertson pupil, tremor of lips and tongue, unsteady gait, increased knee-jerks. Mentally disoriented as to time and place, marked speech defect. All this has taken place in about six months."—P.

The most noticeable result in table 13 is perhaps the total nitrogen. Instead of being far below the normal, as in tables 9 to 12, it is here above the normal, is in fact greater than the laboratory diet could give normally since it is rather more than all the nitrogen contained in the food. Turning to the relative figures it will be seen (1) that the nitrogen phosphate ratio is lower than that of any one of the normal persons, though not nearly as low as the ratio given by H. C. C. in table 9. (2) The nitrogen-sulphate ratio is also somewhat lower than the lowest found among the normal persons, yet this could not be considered enough to be important were it not for the tendency shown by the other cases of general paralysis to have a low, even extremely low, nitrogen-sulphate ratio. (3) The ethereal sulphates in relation to the ordinary sulphates are almost as high as in H. C. C.

(4) The undetermined nitrogenous rest is, as in all the other cases of general paralysis, uniformly greater than the normal.

H. J. W. (table No. 14).

"Age 41. Physical condition excellent. Diagnosis: general paralysis. Unequal, irregular pupils, tremor of tongue, marked speech defect. Knee-jerks slight on reenforcement. Euphoric, expansive. Duration 18 months." —P.

The analytical results show this case to be somewhat similar to the preceding one. Again we find the same abnormally large amount of nitrogen in the urine associated with a slight loss of body weight. The nitrogen-sulphate ratio averages a little lower than the preceding case and the daily variations in this column are very notable. The undetermined nitrogenous rest is large. All the other constituents are fairly normal. This case, it will be seen, offers as a matter of fact not very much ground for the hope that all cases of general paralysis might show metabolism disorders similar to those recorded in tables 9-12.

Mrs. A. D. M. (table No. 15).

"Age 44. Physical condition fair. Diagnosis: general paralysis. Argyll-Robertson pupil, absent knee-jerk, marked speech defect, numerous convulsions, euphoric, disoriented. Duration nearly two years. Died about two weeks after the feeding experiment."—P.

Being a female patient the absolute quantities of the various constituents found in the urine are not comparable with those obtained from the men, since the diet of the women contains only two-thirds as much food.

The undetermined nitrogenous rest is as in the preceding cases higher than the normal. The nitrogen-phosphate ratio is distinctly lower than that of any of the normal persons. The most striking feature is the low nitrogen-sulphate ratio.

The tendency of the nitrogen-sulphate ratios to be low among patients suffering from general paralysis is remarkable enough to merit special attention. It has already been pointed out how uniform this ratio is among the normal persons, the variations being only between 19 and 20.4. Additional importance is given to this ratio in general paralysis by the fact that the ratio is practically as constant among the other patients as it is among the normal persons. Our records of forty-six patients representing

the analyses of one hundred and ninety-two 24-hour quantities of urine show only five cases (representing seventeen 24-hour quantities) of urine in which the average nitrogen-sulphate ratio falls below 19. And among the latter are three cases (representing thirteen 24-hour quantities of urine) in which the average ratio is 18.7 or above, thus leaving only two cases out of forty-six and only four urines out of 192 in which the nitrogen-sulphate ratio, expressed as averages, falls below 18.7.

No. 21. AVERAGES OF NITROGEN-SULPHATE RATIOS.

Name of patient.	No. of urines analyzed.	Average $\frac{N_2}{SO_3}$	Name of patient.	No. of urines analyzed.	Average $\frac{N_2}{SO_3}$
E. B.	4	19.2	E. R.	5	19.4
E. B.	4	19.3	J. Y. W.	7	20.0
F. W. P.	6	20.1	M. W.	6	20.5
F. W. P.	3	19.6	S. R. B.	5	20
F. W. P.	3	20.9	J. H. B.	5	19.5
A. W.	14	19.4	E. H. S.	5	19.8
N. G.	7	19.8	R. L. J.	5	19.3
N. W.	9	19.9	G. E. C.	5	20
G. F.	2	19.2	D. P.	5	19
N. H. S.	2	19.2	W. S. H.	2	12.5
G. C.	2	19.4	W. S. H.	4	19.6
F. S.	2	19.4	S.	6	18.9
F. C.	2	21.1	T.	2	18.3
C. D.	2	20.2	B.	3	18.7
F. L.	2	20.8	H. E. C. (G. P.)	7	18.3
G. P.	2	19.0	" "	9	19.7
E. T.	2	19.0	" "	3	19.7
J. D. B.	2	20.4	" "	9	20
G. P.	2	19.3	Mrs. M. "	6	17.8
J. I.	2	20.1	H. H. V. "	5	18.8
E. B.	4	19.5	W. "	5	18.5
E. C.	6	20.5	W. F. "	4	18.8
J. B.	4	19.	C. N. "	5	19
H. W. W.	7	19.3	F. A. S. "	2	20.3
P. J. C.	4	19.3	D. E. J. "	2	16.5
P. J. C.	3	19.2			
J. S.	4	19.1			
E. F.	4	19.9			
E. F.	3	21.2			
F. M.	5	19.3			
W. C. B.	2	19.5			
H. M. R.	2	19.1			
C. E. C.	7	19.36			
E. C.	2	20.7			
E. B.	2	19.8			
P. N. P.	4	19.2			
W. H. W.	6	20.8			

Taken in conjunction with these facts the nitrogen-sulphate ratios found among the general paralysis cases are certainly remarkable. In the patient H. C. C. (tables 9-12) the three latter tables give normal nitrogen-sulphate ratios, but table 9 gives a ratio of 18.3. The second case (table 13) gives a ratio of 18.8; the third case (table 14) gives a ratio of 18.5; and the fourth

case (table 15) gives a ratio of 17.8. Five other cases of general paralysis are included in the records (tables 16-20) and a detailed study of these also will show a pronounced tendency to give other nitrogen-sulphate ratios than the normal. In table 17, for example, the average ratio is to be sure 19, but in this case for one day the astoundly low ratio of 15 is recorded.

Table 21 gives together the nitrogen-sulphate ratios obtained from all the patients and normal persons thus far investigated.

The above discussion of the nitrogen-sulphate ratios may seem like giving undue prominence to a rather unimportant fact. The purpose of these investigations has been only to find if possible any peculiarity that may exist without regard to how much or how little importance may be properly attached to the same. But it is by no means impossible that the correct interpretation of the changed nitrogen-sulphate ratio in general paralysis will be found in the existence of a quite profound metabolism disorder involving an excessive destruction of body protein containing a smaller percentage of sulphur than that of the diet. Simultaneous collection and analysis of the feces would have settled this point, but as has already been mentioned it was found necessary to leave this work undone. In the continuation of the work the analysis of the feces will be included. A special experiment with a normal person undertaken for a different purpose but well adapted to throw light on this question may be cited here. Dr. A. of the hospital staff was subjected to a feeding experiment lasting nine days during which time he consumed only one half the quantity of liquid diet given to the men patients, the purpose being to see whether he could keep his body weight on such insufficient nourishment (table 22). The instructive feature of this experiment is the fact that with only 9 grams of nitrogen in the food he eliminated 10.6 grams of nitrogen in urine, thus proving conclusively that body protein was destroyed, and accompanying this loss of protein we find the nitrogen-sulphate ratios much below the normal values of the laboratory diet—just as in the general paralysis patients.

W. H. N. F. (table No. 16).

"Age 35. Married. Bank clerk. Physical condition: fairly well nourished. Argyll-Robertson pupils. Speech defect, slight tremor of tongue and hands. Active knee-jerks. Diagnosis: general paralysis. Duration

No. 22. Dr. A. { Weight Jan. 31.....54.500 k.
" Feb. 6.....53.750 k.
Loss.....750 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	100 N_2: SO_3.	100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	100 SO_3: Ethereal SO_3.	100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
Jan.	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated Total										Sum				
31	33 600	166 1.99	167.6 2.01	62.4 3.24	10.3 .124	8.2 .100	88.9 9.83	.... 8.28	293 .41	1.06 .39	.234 .078	235	185	55	20.3	20.5	33	99	6.2	5.0	84.2	4.2	4	.8	6.8
Feb. 1	34 620	178 2.21	170.4 2.16	46.8 2.90	10.8 .134	9.6 .120	91.28 11.31	.... 9.63	290 .40	1.07 .4	.302 .101	236	420 255	55	19.55	18.7	25.7	104.7	6.3	5.7	85.25	88.4 3.55	3.55	.9	6.7
2	34 565	205 2.32	163.6 1.85	52.5 2.97	14.1 .159	12 .124	96.9 10.95	.... 9.30	289 .40	1.07 .4	.220 .073	208	491 278	50	21.2	16.9	27	125.4	8.6	6.7	84.6	88.8 3.6	3.6	.66	7.5
3	33 600	208 2.50	157 1.88	53.3 3.19	10.6 .127	10.8 .130	91.7 11.00	... 9.64	259 .363	1.30 .48	.256 .085	197	486 283	50	22.7	17.1	29	133	6.7	6.9	87.7	88.2 3.3	4.4	.8	3.8
4	14.5 1340	88 2.36	67.2 1.82	26.3 3.52	4.9 .134	6.6 .180	41.58 11.14	.... 9.72	338 .473	1.25 .46	412 .137	306	480 123	50	21.3	16.5	31.7	131.1	7.4	10.0	87.6	91 4.3	4.1	1.2	2.8
5	17 1165	101 2.35	79.4 1.85	29.8 3.47	5 .118	5.6 .130	44.2 10.3	.... 8.87	345 .483	1.258 .466	.394 .131	284	429 182	50	22.8	18	33.7	127	6.4	7	86.7	91.9 4.7	4.7	1.3	3.2
6	24 800	140 2.24	105.2 1.74	46.2 3.70	6.7 .107	11 .180	60.6 9.7	.... 8.1	352 .493	1.26 .466	.209 .070	192	466 269	30	23 1	18	38.2	128.7	6.1	6.9	83.4	91.4 5.1	4.8	.72	6.0
													461									88.5			
Average	813	2.27	1.90	3.27	.130	.140	10.6	9.07	307 .430	1.19 .44	.246 .082	237	225 462	49	21.5	18	31.2	121.3	6.8	6.9	85.6	4.1 89.7	4.2	.9	5.25

about 18 months, commencing with change of character and soon after a convulsion. Later many convulsions and a feeling of general satisfaction with everything."—P.

In this table it is to be noted that the nitrogen-sulphate ratio is below the normal; further, the enormous output of nitrogen (24.5 g.) on January 11, associated with a most remarkable progressive increase in the kreatinin elimination, suggests unmistakably the existence of a very unstable if not pathological state of metabolism.

C. P. N (table No. 17).

"Age 44. Married. Manufacturing chemist. Physical condition: well nourished. Diagnosis: general paralysis. Patient has been in this hospital for 7 years, during which time he has gradually become completely demented and shows all the characteristic physical signs."—P.

The most striking peculiarity of this case is the abnormally low nitrogen-phosphate ratio, and on one day (January 17) a nitrogen-sulphate ratio of 16 as against the normal 19.7. The total nitrogen elimination is below the normal and the ethereal sulphates are higher than the normal. The relative amounts of the four chief nitrogenous constituents are noticeably different from the normal. The sum of urea + ammonia — nitrogen is too low, the undetermined nitrogen too high. The uric acid is entirely too variable and the kreatinin is decidedly below the value which I have reason to consider normal for a person weighing over seventy kilos.

W. H. W. (table No. 18).

"Age 53. Possible syphilis; admits he had a sore on penis when a young man but denies any secondary symptoms. No evidence of old syphilis. Physically: Argyll-Robertson pupil, active knee-jerks. Occasional questionable signs of a speech defect. Undernourished. Sallow complexion. Mental picture: agitated melancholia with many somatic ideas (petrified, throat parted, etc.), which are not more absurd than those of other melancholias. No primary memory defect. In course of time quiets down; physical signs remain the same. Memory good. Rather shallow appreciation of condition, without clear insight. Superficially fairly natural impression. After three months at home it is said that his business judgment has not suffered. Diagnosis: probably general paralysis with remission. At time of admission condition had lasted for about a year."—H.

W. H. W. has been placed among the general paralysis cases although the diagnosis is somewhat doubtful. The analytical results contain practically nothing indicating any abnormal metabolism.

F. A. S. (table No. 19).

"Age 41. Physical condition good. Diagnosis: general paralysis, with marked dementia; marked dulness and memory defect, disorientation, great inactivity, great irritability, delusions that he is only three feet high, weighs three pounds, is shrivelled up, etc. This is the condition from June 15 to 18, and it is essentially the same during the period from August 9 to 17, but during the latter period he alternated from day to day, being one day more unsteady on his feet, more irritable, the next day a little steadier and more easily handled. Physically: speech defect. Some defect of pupil reaction. Patellar reflexes normal."—H.

D. E. J. (table No. 20).

"Age 43. Physical condition: lost 20 lbs. before the experiment and continued to lose after it. Diagnosis: general paralysis of long standing, with profound dementia and confusion, some delusions and at times irritability. Active condition."—H.

Tables 19 and 20 have been included in this list, although the analyses are so incomplete as to throw very little light on the question of abnormal metabolism. Both these cases were studied chiefly with reference to the phosphate metabolism.

From the analytical findings recorded in tables 1-22 it would seem safe to conclude that general paralysis patients kept on a uniform diet are apt to exhibit much greater fluctuations in the urinary constituents than those shown by normal persons under similar conditions.

Special mention must now be made of a rather unique case of general paralysis, in the study of which no less than one hundred and sixty 24-hour quantities of urine were collected and analyzed between October, 1901, and January, 1903.

TABLE 23.

Date.	Time.	Vol. cc.	Sp. gr. 1.0—.	N_2. Gm.	P_2O_5. Gm.	SO_3. Gm.	100 N_2: P_2O_5.	100 N_2: SO_3.	100 SO_3: P_2O_5.
Oct. 21	6.30 a. m.—2.00 p. m.	325	27.5	4.65	0.72	1.19	15.5	25.5	60.5
" 21	2.00 p. m.—9.00 p. m.	160	27.0	2.45	0.42	0.65	17.1	26.5	64.6
" 21	9.00 p. m.—6.30 a. m.	625	24.0	8.37	1.26	1.70	15.0	20.3	74.1
	Totals	1110	....	15.47	2.40	3.54	**15.5**	22.9	**68.0**
Oct. 22	6.30 a. m.—2.00 p. m.	325	23.0	3.10	0.56	0.42	18.1	13.5	133.3
" 22	2.00 p. m.—9.00 p. m.	355	31.0	5.00	1.26	1.27	25.2	22.4	99.2
" 22	9.00 p. m.—6.30 a. m.	305	28.0	5.30	1.09	1.21	20.6	20.6	90.0
	Totals	985	....	13.40	2.91	2.90	**21.7**	21.7	**100.0**
Oct. 23	6.30 a. m.—2.00 p. m.	225	26.0	3.52	0.49	0.60	13.9	17.0	81.7
" 23	2.00 p. m.—9.00 p. m.	225	32.0	4.43	0.59	1.00	13.3	22.6	59.0
" 23	9.00 p. m.—6.30 a. m.	720	20.0	7.92	1.18	1.21	14.9	16.5	97.5
	Totals	1170	....	15.87	2.26	2.81	**14.2**	17.7	**80.4**
Oct. 24	6.30 a. m.—2.00 p. m.	600	13.0	2.97	0.44	0.29	14.8	9.8	151.6
" 24	2.00 p. m.—9.00 p. m.	135	25.0	1.37	0.27	0.20	19.7	14.6	135.0
" 24	9.00 p. m.—6.30 a. m.	700	14.0	5.16	1.07	0.73	20.7	14.1	146.0
	Totals	1435	....	9.49	1.78	1.22	**18.7**	12.9	**146.0**
Oct. 25	6.30 a. m.—2.00 p. m.	310	20.0	3.31	0.51	0.61	15.4	18.4	83.6
" 25	2.00 p. m.—9.00 p. m.	325	25.0	4.10	0.52	0.85	12.7	20.7	61.2
" 25	9.00 p. m.—6.30 a. m.	800	19.0	7.20	1.08	1.09	15.0	15.1	100.0
	Totals	1435	....	14.61	2.11	2.55	**14.4**	17.3	**83.0**
Oct. 26	6.30 a. m.—2.00 p. m.	310	23.0	3.18	0.48	0.51	15.1	16.0	94.1
" 26	2.00 p. m.—9.00 p. m.	225	29.0	2.96	0.63	0.58	21.3	19.6	108.6
" 26	9.00 p. m.—6.30 a. m.	790	08.5	4.03	0.79	0.30	19.6	7.4	256.3
	Totals	1325	....	10.17	1.90	1.39	**18.6**	13.7	**137.0**
Oct. 27	6.30 a. m.—2.00 p. m.	220	22.0	1.83	0.27	0.30	14.7	16.4	90.7
" 27	2.00 p. m.—9.00 p. m.								
" 27	9.00 p. m.—6.30 a. m.	920	22.0	7.73	0.98	1.37	12.7	17.7	71.5

TABLE 23—*Continued.*

Date.	Time.	Vol. cc.	Sp. gr. 1.0—.	N_2. Gm.	P_2O_5. Gm.	SO_3 Gm.	100 N_2: P_2O_5.	100 N_2: SO_2	100 SO_3: P_2O_5.
Oct. 28	6.30 a. m.—2.00 p. m.	625	17.0	3.94	0.68	0.51	17.2	12.9	133.3
" 28	2.00 p. m.—9.00 p. m.	195	29.0	3.57	0.76	0.74	21.3	20.7	102.7
" 28	9.00 p. m.—6.30 a. m.	425	27.5	5.33	1.33	1.30	25.0	24.4	102.3
	Totals.....	1245	....	12.84	2.77	2.55	**21.5**	18.3	**108.5**
Oct. 29	9.30 a. m.—2.00 p. m.	375	25.0	4.22	0.59	0.83	14.0	19.7	71.1
" 29	2.00 p. m.—9.00 p. m.	340	27.0	5.16	0.57	1.12	11.0	21.7	50.9
" 29	9.00 p. m.—6.30 a. m.	800	22.0	8.77	1.13	1.38	12.9	15.7	82.0
	Totals.....	1515	....	18.15	2.29	3.33	**12.6**	18.3	**69.0**

Date.	Time.	Vol. cc.	Sp. gr. 1.0—.	N_2. Gm.	P_2O_5. Gm.	SO_3. Gm.	100 N_2: P_2O_5.	100 N_2: SO_3.	100 SO_3: P_2O_5.
Oct. 30	6.30 a. m.—2.00 p. m.	450	23.0	4.23	0.67	0.68	15.8	16.0	98.5
" 30	2.00 p. m.—9.00 p. m.	340	26.0	4.40	0.98	1.12	22.3	25.5	87.5
" 30	9.00 p. m.—6.30 a. m.	595	16.0	6.19	0.86	1.08	13.9	17.4	80.0
	Totals.....	1385	....	14.82	2.51	2.82	**17.0**	19.2	**90.0**
Oct. 31	6.30 a. m.—2.00 p. m.	175	29.0	3.27	0.30	0.61	9.2	18.6	49.2
" 31	2.00 p. m.—9.00 p. m.	240	31.0	5.38	0.54	1.15	10.0	21.4	47.0
" 31	9.00 p. m.—6.30 a. m.	890	14.0	7.48	0.87	0.99	11.6	13.2	87.8
	Totals.....	1305	....	16.13	1.71	2.75	**10.6**	17.1	**62.5**
Nov. 1	6.30 a. m.—2.00 p. m.	420	20.0	3.57	0.39	0.54	10.9	15.1	72.2
" 1	2.00 p. m.—9.00 p. m.	400	28.0	4.53	1.03	1.05	22.7	23.2	98.1
" 1	9.00 p. m.—6.30 a. m.	250	27.0	4.07	0.72	0.72	17.7	17.7	100.0
	Totals.....	1070	....	10.88	2.14	2.31	**20.0**	21.2	**92.6**
Nov. 2	6.30 a. m.—2.00 p. m.	335	24.0	3.92	0.40	0.63	10.2	16.1	63.3
" 2	2.00 p. m.—9.00 p. m.	345	16.0	4.60	0.52	0.56	11.3	12.2	93.0
" 2	9.00 p. m.—6.30 a. m.	790	12.0	4.79	0.82	0.74	17.1	15.5	110.8
	Totals.....	1470	....	13.31	1.74	1.93	**13.1**[1]	14.5	**90.0**[1]

[1] Some error has evidently crept into the analyses of this day, probably into the sulphate analyses, since the N_2: SO_3 ratio is much lower and the SO_3: P_2O_5 ratio much higher than on any previous corresponding day. This error was not discovered until it was too late to repeat the analyses.

TABLE 24.

Date.	Time.	Volume.		Sp. Gr. 1.0—.		N_2. Gm.		P_2O_5. Gm.		SO_3. Gm.		100 N_2 : P_2O_5.		100 N_2 : SO_3.		100 SO_3 : P_2O_5.	
		Patient.	Control.	Patient.	Control.	Patient.	Control.	Patient.	Control.	Patient.	Control.	Patient.	Control.	Patient.	Control.	Patient.	Control.
Nov. 3	6.30 a. m.—2.00 p. m.	615	255	18.0	28.0	6.87	3.86	1.50	0.64	1.21	0.84	21.8	16.6	17.6	21.8	124.0	76.2
Nov. 3	2.00 p. m.—9.00 p. m.	465	315	26.5	30.5	5.58	6.55	1.83	1.52	1.29	1.34	32.8	23.2	23.1	20.5	141.8	113.4
Nov. 3	9.00 p. m.—6.30 a. m.	580	320	20.0	31.5	4.00	5.79	0.80	1.50	1.05	1.15	21.5	25.8	26.2	20.0	81.9	130.4
	Totals.....	1660	890	....	....	16.45	16.20	4.19	3.66	3.55	3.33	**26.0**	**22.6**	22.2	20.5	**118.0**	**110.0**
Nov. 4	6.30 a. m.—2.00 p. m.	490	160	23.0	32.0	5.13	2.81	0.80	0.52	1.00	0.48	15.6	18.5	19.5	17.1	80.0	108.3
Nov. 4	2.00 p. m.—9.00 p. m.	375	275	25.0	35.0	6.07	5.28	0.67	1.11	1.22	0.89	11.0	21.0	20.1	16.8	55.0	124.7
Nov. 4	9.00 p. m.—6.30 a. m.	950	430	17.0	34.5	9.08	9.37	1.23	2.04	1.00	1.66	13.5	21.7	11.0	17.7	123.0	123.0
	Totals.....	1815	865	....	....	20.26	17.46	2.70	3.67	3.22	3.03	**13.3**	**21.0**	15.9	17.3	**83.9**	**121.1**
Nov. 5	6.30 a. m.—2.00 p. m.	475	365	22.5	32.5	4.01	5.62	0.78	1.15	0.59	0.82	19.4	20.4	14.7	14.6	132.2	140.2
Nov. 5	2.00 p. m.—9.00 p. m.	480	350	26.5	33.0	5.89	6.30	1.51	1.55	1.15	1.38	25.6	20.0	19.5	22.0	122.0	90.6
Nov. 5	9.00 p. m.—6.30 a. m.	570	280	15.0	35.0	5.32	6.17	1.12	1.36	0.92	1.03	21.0	22.0	17.3	16.7	121.7	132.0
	Totals..... ...	1525	995	....	....	15.22	18.09	3.41	3.76	2.66	3.23	**22.4**	**20.8**	17.4	17.8	**128.2**	**116.0**
Nov. 6	6.30 a. m.—2.00 p. m.	665	275	22.0	34.0	6.89	4.98	1.05	0.82	1.12	0.89	15.2	16 5	16.3	17.9	93.7	92.1
Nov. 6	2.00 p. m.—9.00 p. m.	440	375	23.0	27.0	4.37	5.13	0.62	0.93	0.86	1.01	14.2	18.1	19.7	20.0	72.1	92.1
Nov. 6	9.00 p. m.—6.30 a. m.	850	375	20.0	29.0	7.26	6.54	1.10	1.40	1.16	1.19	15.1	21.4	16.0	18.2	94.8	117.7
	Totals.....	1955	1025	....	....	18.52	16.65	2.77	3.15	3 14	3.09	**15.0**	**18.9**	17.0	18.6	**88.2**	**102.0**
Nov. 7	6.30 a. m.—2.00 p. m.	450	310	23.0	31.0	4.54	4.86	0.98	0.89	0.73	0.99	21.6	18.3	16.1	20.4	134.3	90.0
Nov. 7	2.00 p. m.—9.00 p. m.	325	700	25.0	13.0	4.14	5.59	1.25	1.01	0.85	1.00	30.2	18.1	20.5	18.0	147.0	101.0
Nov. 7	9.00 p. m.—6.30 a. m.	525	340	19.0	28.0	6.91	6.33	1.81	1.28	1.10	1.34	26.2	20.2	15.9	21.1	164.5	95.5
	Totals.....	1300	1350	....	...	15.59	16.78	4.04	3.18	2.68	3.33	**25.9**	**19.8**	17.2	19.9	**151.0**	**95.5**
Nov. 8	6.30 a. m.—2.00 p. m.	500	280	25.0	30.0	4.45	4.85	0.53	0.83	0.85	0.91	12.6	17.1	19.1	18.8	65.9	91.2
Nov. 8	2.00 p. m.—9.00 p. m.	395	375	32.5	29.0	6.86	7.12	1.18	1.33	1.16	1.57	17.2	18.6	17.0	22.0	101.0	85.0
Nov. 8	9.00 p. m.—6.30 a. m.	580	590	21.0	25.0	7.55	9.79	1.17	2.14	1.13	1.48	15.5	21.8	15.0	15.2	103.5	144.6
	Totals.....	1275	1245	....	....	18.86	21.76	2.91	4.30	3 14	3.96	**15.4**	**19.8**	16.7	18.2	**92.7**	**109.0**

TABLE 25.

Date.	Volume. cc.	Sp.Gr. 1.0—.	N_2 Gm.	P_2O_5 Gm.	SO_3 Gm.	100 N_2:		100 SO_3:	N_2 in fæces Gm.
						P_2O_5.	SO_3.	P_2O_5.	
Nov. 13	1285	22.5	16.1	3.71	3.26	**23.0**	20.3	**114.0**	
" 14	930	29.0	17.0	2.24	3.39	**19.0**	20.0	**95.6**	
" 15	960	32.0	17.6	3.81	3.37	**21.6**	19.1	**113.0**	3.21
" 16	1030	29.5	18.2	3.20	3.36	**17.5**	18.5	**95.2**	
" 17	925	32.5	17.0	3.90	3.34	**22.9**	19.6	**116.7**	0.55
" 18	900	33.0	17.5	3.34	3.23	**19.1**	18.4	**103.0**	6.38
" 19	850	34.0	16.9	3.89	3.25	**23.0**	19.2	**120.0**	1.30
" 20	820	31.5	16.8	3.02	3.32	**18.0**	20.0	**90.0**	
" 21	1055	30.0	17.3	4.34	3.15	**25.1**	18.2	**138.0**	2.40
" 22	960	27.5	16.6	3.09	3.21	**18.6**	19.3	**96.0**	
" 23	935	29.0	16.1	3.54	3.18	**22.0**	19.7	**111.0**	0.98
" 24	995	25.0	17.0	3.14	3.01	**18.5**	17.7	**104.0**	2.16
" 25	915	30.0	15.8	3.59	3.12	**22.7**	19.7	**115.0**	1.13

A brief report of this case was published in the April number of the *American Journal of Physiology*, 1902 (Vol. VII, p. 135). From this paper we quote the following:

"Dr. Hoch gives us the following summary of his description of the case:

"The patient's condition alternated with absolute regularity from day to day, being one day little removed from the normal, while quite disturbed on the other. These two states presented the following pictures: On the disturbed days the patient was often restless, walking aimlessly about with short steps, talking in the manner described below, or he handled things about him in an aimless way or took off his clothes, etc. His talk indicated that his ability to guide voluntarily his train of thought was much diminished. The different thoughts he uttered were but superficially connected, or his talk was constantly deflected by external happenings (great distractibility). Sometimes when less voluble he repeated the same question many times in a senseless manner or made remarks which were superficially suggested but which had no internal connection with what was spoken or what the circumstances demanded. Consequently when the abnormality was least marked, the main feature was a certain irrelevancy in the patient's remarks. The facial expression was almost always dull and immobile, the mood rather apathetic, but at times an irritability and occasionally a striking exhilaration were noted. He never lost his bearings, probably because the good days were constant correctives, but he had no clear appreciation of things or occurrences about him and on the good days he remembered poorly the sequence of events of the previous bad days. On the good days he often varied but little from the normal, but appeared somewhat dull without perfect appreciation of his condition and at times an irrelevant remark betrayed slight traits of the bad days."

TABLE 26. Name, Mr. F. C. P.

1902. 24 hours ending	Cc. in 24°.	Sp. gr. 1.0—	N_2. Mg. in cc.	N_2. Total gm.	P_2O_5. Mg. in 50 cc.	P_2O_5. Total gm.	SO_3. Mg. in 50 cc.	SO_3. Total gm.	Ratios. 100 N_2 : P_2O_5.	Ratios. 100 N_2 : SO_3.	Ratios. 100 SO_3 : P_2O_5.
May 25	940	24	79	14.87	152.5	2.87	157	2.89	19.3	19.5	99.1
" 26	970	30.5	83.9	16.27	210	4.07	162	3.14	25	19.3	129.6
" 27	800	29.5	46	15.37	197.5	3.16			20.5		
" 28	1220	26.5	65	15.85	158	3.84			24.2		
" 29	1040	21.5	71	14.85	160	3.33	148	3.08	22.4	20.8	108
" 30	1560	20.5	52	16.25	153	4.76	97	3.04	29.4	18.7	157
" 31	855		75	12.81	178	3.03	165	2.82	23.7	22	108
June 1	1240	24.5	66	16.77	160	4.09	122	3.12	24.4	18.6	131.5
" 2	775	25	92	14.25	205	3.17	190	2.95	22.2	20.7	107.8
Average.	**1050**			**15.25**		**3.59**		**3.00**	**23.6**	**19.67**	**119.6**
Average of "good" days	**882**			**14.43**		**3.11**		**2.93**	**21.55**	**20.3**	**106**
Average of "nervous" days.	**1260**			**16.28**		**4.19**		**3.10**	**25.74**	**19.04**	**135**

TABLE 27. Name, Mr. F. C. P.

June 22	1460	21	52	15.16	105	3.07	109	3.19	20.2	21	96
" 23	1760	16	40	14.24	105	3.49	79.5	2.80	24.4	19.6	124
" 25	1880	15	37	13.79	93	3.48	69	2.58	25.2	18.9	123
" 26	1220	23.5	63	15.47	142	3.46	132	3.21	22.3	21.4	108
" 27	1660	19	47.6	15.80	100	3.32	88.5	2.94	21	18.6	113
" 28	1475	18	50.4	15.93	115	3.41	105	3.10	21.4	19.4	110
" 30	1380	22	62	17.00	113	3.12	112	3.10	18.3	18.2	101
July 2	1215	21	70	17.01	150	3.64	138	3.35	21.4	19.8	101
" 3	1310	21	62.7	16.43	109	2.84	124	3.26	17.3	19.9	87
" 4	1850	15	45	16.52	88	3.25	79.5	2.94	21	18	111
" 8	1130	19	55	12.47	117	2.63	119	2.69	21.1	21.6	98
" 9	1075	26	83	17.91	155	3.33	161	3.45	18.7	19.3	96.6
" 10	670	29	65	8.70	152	2.03	129	1.73	23.3	20	117
" 11	1400	18	56	15.76	120	3.56	102	2.86	22.6	18.2	124
" 12	1700	16	46	15.71	102	3.45	89.4	3.04	22	19.3	113
" 13	860	22	73	12.50	192	3.38	160	2.75	27	22	123
" 14	1425	20	57	16.24	119	3.39	112	3.19	20.9	19.6	106
" 15	675	30.5	99	13.44	247	3.34	237	3.20	24.9	23.8	104
" 16	950	28	85	16.17	195	3.71	154	2.62	22.9	16.2	141
" 17	1340		42	11.33	98	2.63			23.2		
" 18	900		71.3	12.83	175	3.15			24.5		
" 19	700		79.8	11.17	179	2.51			22.4		
" 20	1000		72.4	14.48	157	3.15			21.7		
Average	**1262**			**14.57**		**3.19**		**2.95**	**22.07**	**19.7**	**110.3**
Average of "good" days	**1260**			**14.83**		**3.19**		**2.92**	**21.44**	**19.5**	**109.2**
Average of "nervous" days	**1265**			**14.24**		**3.19**		**2.98**	**22.67**	**20**	**111.8**

No. 29. Name, MR. F. C. P.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	Per cent of total N_2. NH_3.	Per cent of total N_2. Kreatinin.	Per cent of total N_2. Uric acid.	Per cent of total N_2. Rest.
January	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated									Sum				
9	16	90	87.5	43.5	....	....	45	28.3	476	....	496	544	....	25	20.2	19.6	48.6	103.3	....	....	87.12	4.38	....	....	....
	1700	3.06	2.97	7.38	....	...	15.18	13.22	.666	....	.165	65	544								91.5				
10	30	192	175	48.5	....	....	83	27.26	480	....	472	616	....	35	23.1	21	28.6	110	....	....	86	4.5	....	....	....
	890	3.42	3.11	4.23	..	....	14.80	12.72	.67	....	.157	....	....								90.5				
11	19	135	106	39	....	....	55	28.56	545	....	....	725	....	38	24.3	18.9	35.3	137	....	....	85.5	4.9	....	....	....
	1405	3.79	2.98	5.48	....	....	15.62	13.33	.763	....	....	....	....								90.4				
12	25	165	142.5	49.5	....	....	69	28.84	454	....	....	658	....	18	24	20.8	36.2	115	....	....	86.32	4.08	....	....	....
	1135	3.74	3.24	5.64	....	....	15.60	13.46	.636	....	....	....	....								90.4				
13	19	128	109.4	37.5	....	....	55	29.06	513	....	....	598	....	33	24.3	20	34.2	121.4	....	....	86.9	4.6	....	....	....
	1425	3.79	3.12	5.34	....	....	15.60	13.56	.717	....	....	....	....								91.5				
14	24	166	148	45.5	....	....	74	30.58	532	....	....	688	...	38	21.1	20	31.7	105	....	....	87	4.5	....	....	....
	1110	3.46	3.29	5.22	....	....	16.60	14.27	.745	....	....	....	...								91.5				
15	20	138	115.4	45	....	....	58	30.51	476	....	....	672	....	38	23.9	20	39.1	119	....	....	88.3	4.1	....	....	....
	1400	3.86	3.23	6.31	....	....	16 13	14.24	.666	....	....	....	....								92.4				
16	23	133	107.3	34	....	....	57	31.72	522	....	....	673	....	50	23.2	18.7	29.8	124	....	....	89.2	4.4	....	....	...
	1450	3.86	3.11	4.94	....	....	16.61	14.80	.73	....	....	....	....								93.6				
17	17	113	102	26.3	...	....	51	32.01	504	....	....	564	....	100	22.2	20	25.8	110.6	....	....	88.43	4.17	....	....	....
	1660	3.75	3.39	4.36	....	....	16.92	14.94	.705	....	...	....	....								92.6				
18	26	200	170.2	48	....	....	82.5	28.89	486	....	....	617	...	50	24.2	20.6	29	118	....	....	87.66	4.4	....	....	....
	935	3.74	3.18	4.49	....	....	15.42	13.50	.680	....	....	....	....								92.06				
19	19	118	99.1	40.5	....	....	52.5	31.30	502	....	....	565	....	50	22.5	18.8	38.6	119	....	....	88.6	4.2	....	....	....
	1570	3.71	3.11	6.36	....	....	16.48	14.61	.70	....	....	....	....								92.8				
20	22	168	136.4	45.3	....	....	66	28.01	481	....	....	756	...	60	26.5	20.6	34.3	128.7	....	....	87.87	4.5	....	....	....
	1125	3.95	3.07	5.10	....	....	14.87	13.07	.673	....	....	....	....								92.37				
Average	1317	3.67	3.19	5.41	....	....	15.81	29.60	495	....	....	703	....	45	23.26	20.2	34.2	115.2	....	....	87.4	4.38	...	....	....
								13.81	.693	....	....	....	....								91.78				

This condition, which has now lasted uninterruptedly for several months, seemed to offer an unusual opportunity for trying to discover some alternation in the metabolism of the patient corresponding to the alternation in the mental symptoms. Any sufficiently characteristic alternation in the patient's metabolism was deemed important, because we can scarcely be said to have as yet the proof of the existence of any abnormal metabolism whatever which is characteristically associated with any of the mental diseases.

The existence of an unmistakable periodicity in the elimination of phosphoric acid through the kidneys corresponding to the periodicity in the mental condition of this patient is, we think, proved by the analyses and experiments recorded below.

Tables 23-25, taken from the same paper, contain the essential facts of our earlier experiments. Only the last table, No. 25, is obtained from a uniform diet, but table 24 is almost equally conclusive, because the control person (the nurse) consumed as nearly as possible the same kind and amount of food as the patient and the figures given by the control are, it will be seen, far more uniform than those of the patient.

At that time and in fact throughout the period of our subsequent experiments the case in question was held to be one of manic-depressive insanity, but at the post mortem examination made at the State Hospital in Taunton in January, 1904, by Dr. Hoch and Dr. Harry Miller, it was found to be a case of general paralysis.[1]

Many of the later experiments made on this patient were undertaken for the purpose of trying to determine in how far his condition was dependent on his food. They involved therefore the use of different diets, and as the results obtained were not very convincing they will not be recorded. Some of the later uniform laboratory diet experiments will, however, be given here. The persistent and pronounced daily variations which characterized this patient during our earlier experiments had considerably

[1] In view of the great amount of analytical work expended on this case and the increasing uncertainty in regard to the diagnosis, much credit is due Dr. Miller for his interest and cooperation without which the decisive autopsy would never have been obtained.

diminished before we had come to adopt a standard laboratory diet, and although we took advantage of the occasional returns of this peculiar condition the later records are less striking. Table 26 represents such a period of pronounced daily alternation in the condition of the patient, and during this time it will be seen that on the "nervous" days (the even dates) the phosphates in the urine average 4.19 g. as against 3.11 g. on the good days, and the average nitrogen-phosphate ratios are respectively 25.7 and 21.5.

At the end of this period the alternating condition of the patient began to disappear and did not return to a sufficient degree to affect noticeably the phosphate metabolism. In table No. 29, for example, there is no longer to be found any regular variation in the phosphate elimination.

In the paper referred to above, p. 150, an attempt was made to explain the peculiar variations in the phosphate elimination of this patient by assuming a condition analogous to diabetes, but being periodical and confined to the phosphates instead of to the carbohydrates. This hypothesis, taken together with the mistaken diagnosis of manic depressive insanity, influenced greatly the subsequent experiments, and for a time it was thought that the phosphate metabolism in manic depressive insanity is characteristically different from the normal. Further experiments failed, however, to verify this view, and now with a definite identification of the case in question as one of general paralysis it would seem more fruitful to regard the peculiar variation in the phosphate elimination recorded in tables 23-27 as a most striking illustration of the remarkable tendency on the part of general paralysis to exhibit greater than normal fluctuations in the urinary constituents. It is much to be regretted that we were at no time able to make a complete analytical record of this case. I fully believe that we should have obtained some very instructive results if this could have been done when the clinical symptoms were sharply alternating.

The fluctuations here recorded in connection with general paralysis explain why the earlier metabolism literature of this disease is so full of contradictory results. They also indicate that the disease may indeed be essentially a metabolism disorder, but to get unmistakable light on this point will require a great deal of careful metabolism work.

On the pages that follow will now be given in tabular form the analytical data obtained from similar feeding experiments with other patients. Every attempt to find in these tables any indication of a characteristic metabolism corresponding to the given clinical classifications has failed. I shall therefore not attempt to discuss the results in detail. The chief present value attached to the figures from a clinical point of view is that they show how unreliable must be the statements made in literature from time to time about any abnormal metabolism characteristic of any of these common forms of mental diseases. I could easily point out a dozen papers on the metabolism of the insane published during the past five years, the main contention of which can be shown to be erroneous by the figures recorded in these tables. To do so would, however, only be to engage in useless controversies.

On the other hand, by comparing the figures given in tables 30-47, i. e., those most completely covered by the analytical work, with the standard values of table No. 8, it would seem as though *individual* peculiarities (abnormalities?) are of very frequent occurrence, the cases of more or less abnormal metabolism representing fully one half of the cases recorded.

J. Y. W. (table No. 30).

"Age 51. According to physician's account the patient has had syphilis. About a year before admission somewhat depressed after business troubles but soon works again. A few months before admission becomes dull, apathetic, again depressed and restless. No headaches. Dulness shows daily variations in intensity (not quite consistent). He is admitted in rather poor physical condition; weak, irregular pulse. Dull, slow in motion and speech. This varies somewhat from day to day, but even on freer days poor memory, great difficulty in thinking and in retaining impressions, poor grasp on surroundings. With this unequal knee-jerks at first. Later markedly unequal facial innervation. Temporary insufficient reaction of pupils. Difficulty in starting stream in urinating. Hard-writing with omission of letters and mistakes. No speech defect. Optic disk normal. Both physical and mental symptoms clear up in course of 2 months except the inequality of knee-jerks. Mentally, he became more alert but developed a certain querulousness. Six months after discharge he is said to be at a standstill—did not get back to work. Diagnosis questionable. It may be general paralysis."—H.

Metabolism not normal. Total nitrogen and kreatinin elimination is below the normal and too variable, and the "neutral" sulphur is greater than normal.

C. C. W. (table No. 31).

"Age 20. Physical condition good. Diagnosis: Dementia præcox Nearly two years' duration, characterized by delusions such as that his strength is running off the end of his penis, that he must hold on to it to save it, or that it is leaving his heart and he wears a magazine over it. Talk is somewhat scattered. Normal motor activity. Later typical, grave, dementia præcox deterioration."—H.

Metabolism almost normal. Nitrogen-sulphate ratio outside the normal limits.

A. W. (table No. 32).

"Age 58. Physical condition good. Diagnosis: unquestionable, manic-depressive insanity. During the experiment she was in a mixed state of medium intensity. On the emotional side there was a tendency to exhilaration. Motor activity about normal. On the ideational side marked slowness of thinking and some evidence of flight of ideas. Poor grasp on surroundings. Throughout the period there was a tendency to variation, but not a daily alteration."—H.

Metabolism normal.

A. R. (table No. 33).

"Age 56. At menopause, depression with at first restlessness, apprehensiveness, poor grasp on surroundings. After a few days development of somatic ideas which henceforth dominate the clinical picture. She is quiet, says little, narrowing of mental horizon."—H.

Metabolism almost normal, ethereal sulphates very high, uric acid abnormally low, indican high.

G. W. P. (table No. 34).

"Age 52. Physical condition excellent. Diagnosis: manic-depressive insanity. Characterized by depression, retardation, but also some restlessness, and a few somatic ideas. Third attack."—P.

Metabolism practically normal. Etereal sulphates high, indican very high.

W. H. (table No. 35).

"Age 26. Physical condition good. No disorders of vegetative organs. Diagnosis: dementia præcox deterioration (with scattered talk) of five years' standing."—H.

Metabolism almost normal. Ethereal sulphates above, uric acid below, the normal.

E. F. (tables 36, 37).

"Age 41. Physical condition normal, well nourished. Diagnosis: manic-depressive insanity, excited form. Mild excitement showing itself in talkativeness, over-activity, sometimes anger, usually exhilaration, slight flight of ideas, but perfectly good grasp on surroundings. Five days previous to experiment she had been in a state of marked motor retardation. Condition stable through experiment."—H.

(Second period.) "This period resembled very much the first and is about the same in intensity."—H.

Metabolism perfectly normal.

P. E. (table No. 38).

"Age 17. Gradually developing dementia præcox. During experiments dull, paralogia, mannerisms, occasional catatonic positions. Ideas of influence, impulsive acts."—H.

Metabolism nearly normal. Nitrogen-sulphate ratio rather low, neutral sulphur high.

E. C. (table No. 39).

"Age 63. Physical condition: rather undernourished; no disorder of vegetative organs. Diagnosis: manic-depressive insanity, with moderate retardation, slowness in thinking, dearth of ideas. Condition remarkably stable and not essentially different in the two periods."—H.

Metabolism normal but ethereal sulphates high.

E. N. M. (table No. 40).

"Age 47. Widow. Rather large, fleshy woman with chronic nephritis. Headaches for at least a year. Then several slight convulsions, finally a marked one, after which the patient had a delirium with confusion, activity, hallucinations and delusions. She cleared in about 3 days with perfect insight, normal mental condition, which is present during the experiment."—P.

Metabolism very abnormal. The kreatinin, the uric acid, and the ammonia elimination is less than half the normal and the acidities are altogether too variable. This is very significant in view of the fact that the patient died of "uræmia" shortly afterwards. The undetermined nitrogenous rest is too high, the nitrogen-phosphate ratio is too low. The nitrogen-sulphate ratios show a progressive diminution that is certainly interesting. From the absolute values it looks as though the absorption of a rather large amount of nitrogenous food forced the kidneys to eliminate more and more total nitrogen and phosphates while the utmost

excretory capacity of the kidneys either for sulphates or for ammonia had been reached, resulting in a retention of ammonium sulphate.

G. S. (table No. 41).

"Age 33. Physical condition good. No disorder of vegetative organs. Diagnosis: manic-depressive insanity, depressed form, with lack of initiative, decided difficulty in thinking, some slowness in motion and diminished motor activity. No emotional depression except episodically, and also episodically slight traces of exhilaration."—H.

Metabolism not normal. The elimination of total nitrogen and of kreatinin is too variable, the nitrogen-sulphate ratios are too low, and the relative amounts of ethereal sulphates and of neutral sulphur are too high.

P. S. (tables 42-43).

"Age 18. Physical condition: poorly nourished. Diagnosis manic-depressive insanity, depressed form. Retardation of marked intensity, some of it probably due not to actual retardation but to intensification by hypochondriacal delusions and complaint that whenever he moves he has pains. Condition throughout the experiments stable."—H.

Metabolism not very abnormal but very unsettled. This is to be seen first of all in connection with the ammonia elimination, particularly in table 43; also in connection with the volume of urine and of total nitrogen eliminated, and further in ethereal sulphate and neutral sulphur ratios. Compare also the lack of uniformity in the kreatinin values of table 43 as against the corresponding figures of table 42.

N. G. (table No. 44).

"Age 53. Good physical condition, no disorder of vegetative organs. Diagnosis: dementia, with speech confusion, bizarre behavior, after dementia præcox 23 years previously. Condition stable."—H.

Metabolism normal.

J. S. (table No. 45).

"Age 64. Physical condition: moderate nutrition, arterio-sclerosis, and enlarged heart. Diagnosis: First attack of melancholia, which started with fear and confusion. During the laboratory diet a certain listlessness, diminished motor activity, narrowing of mental horizon. May be an involution melancholia or a late manic-depressive condition, more likely the latter. Condition stable during experiment."—H.

Metabolism normal.

T. M. B. (table No. 46).

"Age 29. Physical condition good. Diagnosis: Dementia præcox with slow, insidious onset, two years' duration. Absurd delusions, scattered ideation, marked dementia."—H.

Metabolism normal.

C. E. C. (table No. 47).

"Age 68. Physical condition: good, very stout. Diagnosis: involution melancholia, with hypochondriacal ideas, narrowing of mental horizon, normal motor activity."—H.

Metabolism scarcely normal. The ammonia, the undetermined nitrogen and the organic sulphur are all outside the limits set by the control persons in table 8.

P. J. C. (table No. 48).

"Age 57. Physical condition: under weight. The condition is one of gastric neurosis, distress after eating, general soreness, occasional complaint of palpitation and much complaint of weakness, but there is nothing revealed on physical examination of heart, stomach or lungs. He has no real mental symptoms."—H.

Miss E. D. (table No. 49).

"Age 48. Physical condition: no abnormalities of vegetative organs, fairly well nourished. Diagnosis: manic-depressive insanity, depressed form, second attack. Marked agitation, but retardation in speech movements, depressive delusions, good grasp on surroundings. Condition stable."—H.

H. W. W. (table No. 50).

"Age 21. Good physical condition. Diagnosis: dementia præcox, with mutism and inactivity, but not stupor. Condition stable."—H.

E. B. (table No. 51).

"Age 24. Physical condition: good. Diagnosis: fairly marked dementia of dementia præcox of some years' standing. Normal motor activity."—H.

Mrs. I. M. (table No. 52).

"Age 36. Physical condition: well nourished but under weight. No disorder of vegetative organs. Diagnosis: katatonia. Three former attacks with recovery. Has been in a stupor, but during the diet period in a state of peculiar perplexity, with poor grasp on surroundings, poor memory, childish behavior, some diminution of motor activity. Possibly a state of permanent dementia."—H.

M. H. W. (table No. 53).

"Age 60. Physical condition: no disorders of vegetative organs except rather feeble pulse. Diagnosis: organic dementia of questionable origin, characterized essentially by a marked memory defect (but, unlike general

paralysis, not associated with a general breaking up of the personality, but with preservation of natural social reaction). With this marked alterations in gait and other nervous symptoms. The gait improved somewhat during the experiment and his memory became somewhat better."

48-53. The metabolism seemingly normal, but the analytical work not sufficiently complete.

W. F. (table No. 54).

"Age 44. Fair physical condition, no abnormality of vegetative organs. Diagnosis: manic-depressive insanity, excited form. Motor excitement of moderate intensity, but constant talkativeness. Intense flight of ideas with poor grasp on surroundings. Marked exhilaration. Condition very stable for months, and there is no appreciable difference during the three periods of laboratory diet."—H.

W. H. S. (table No. 55).

"Age 63. Physical condition: enlarged heart, some arterio-sclerosis, some tremor. Diagnosis: alcoholico-senile condition (up to some weeks before the experiment patient had been in a state of marked disorientation with hallucinations); during experiment a slight confusion, at times hallucinations, at times slight semi-stuporous attacks. Poor memory for recent events."—H.

A. C. (table No. 56).

"Age 29. Good physical condition. Diagnosis: dementia with apathy and scattered ideation of years' standing; dementia præcox."—H.

F. S. (table No. 57).

"Age 63. Physical condition: Under weight. No disorders of vegetative organs. Diagnosis: hypochondriacal involution melancholia of long standing. Deterioration with narrowing of mental horizon. About normal motor activity."—H.

B. B. (table No. 58).

"Age 70. Physical condition: rather under nourished, some arterio-sclerosis, with trace of albumin and casts in the urine at entrance. Diagnosis: manic-depressive insanity (?), depression, second attack, with some agitation, some fear, depressive delusions, but good grasp on surroundings."—H.

E. T. (table No. 59).

"Age 49. Physical condition: good. Diagnosis: manic-depressive insanity, depressed form. Slight feeling of inadequacy and depression. Whole condition very slight."—H.

F. C. (table No. 60).

"Age 66. Physical condition: fairly well nourished, some arterio-sclerosis, some emphysema. Diagnosis: manic-depressive insanity, depressed form. Very mild retardation, with marked feeling of inadequacy. Depression of feelings."—H.

C. E. D. (table No. 61).

"Age 44. Physical condition: good; has a wound from attempted suicide which is not yet quite closed and he has a temperature every evening up to 99.8°. Diagnosis: probably manic-depressive insanity; during the experiment he was practically well, having been well for some time, or there may have been a slight irritability and exhilaration; hence, if an active process, a very mild one."—H.

J. A. S. (table No. 62).

"Age 70. Physical condition: fairly nourished, rather pale, no disorder of vegetative organs. Diagnosis: manic-depressive insanity, with many repetitions of excitement. During the period of May 17 to 20, he was perfectly quiet and natural, but perhaps somewhat irritable. On the 29th of May an attack of excitement commenced, and during the period from June 4 to 7, he was in a state of moderate but constant motor excitement, with much exhilaration and irritability, and outbursts of anger, and with fairly well-marked incoherence of speech."—H.

Miss J. P. (table No. 63).

"Age 54. Physical condition: undernourished, with no disorder of vegetative organs except constipation. Diagnosis: manic-depressive depression, with great emotional depression and some restlessness; with the exception of stereotyped repetitions in her moaning, very little talk; and except for stereotyped rocking to and fro as an expression of her discomfort, markedly diminished motor activity. Good grasp on surroundings."—H.

Mrs. M. H. R. (table No. 64).

"Age 28. Physical condition: fairly well nourished; no disorder of vegetative organs except constipation. Diagnosis: manic-depressive insanity, with very marked motor retardation, moderate emotional depression and slowness in thinking. Good grasp on surroundings."—H.

Miss L. P. (table No. 65).

"Age 33. Physical condition: fair, no abnormalities of vegetative organs. Fair nutrition, but under normal weight. Diagnosis: manic-depressive insanity, depressed form, with diminished motor activity, but much greater diminution of mental activity, with dearth of ideas and poor grasp on surroundings. Condition stable."—H.

M. L. R. (table No. 66).

"Age 52. Physical condition: fairly well nourished, mitral insufficiency with some hypertrophy. Good compensation. Diagnosis: experiment made during convalescence from a short attack of excitement of questionable origin. Condition normal during experiment."—H.

R. D. (table No. 67).

"Age 42. Physical condition: good. Diagnosis: dementia of years' standing. Dementia præcox type. Normal motor activity."—H.

No. 30. Name, Mr. J. Y. W.—Weight about 70 kilos.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, grms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, grms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	100 N_2: SO_3.	100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	100 SO_3: Ethereal SO_3.	100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
June	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated.										Sum.				
21	16 1480	83 2.46	63 1.86	34.1 5.04	6.9 .206	3.4 .100	31.9 9.46	17.55 8.19	284 .398	.876 .326	.333 .111	420 142	 278	70	23	19.6	53	132	11	5.4	86.6	4.2	3.4	1.1	4.7
22	17 1270	85 2.16	60.3 1.53	41.02 5.23	5.3 .135	9.1 .231	30 7.68	14.57 6.80	234 .338	.752 .279	.266 .089	356 111	 245	125	28.1	20	69	141	8.8	15.1	90.8 87.3	4.27	3.6	1.16	3.7
24	 1750	97 3.39	83.9 2.93	29.1 5.09	7.7 .269	9.1 .319	44.9 15.73	28.89 13.48	462 .646	1.80 .485	.300 .100	645 105	 560	50	21.5	18.7	32.3	115	9.3	11	91.57 85.9	4.1	3.09	.6	6.3
25	14.5 2100	79 3.32	54.5 2.52	28.4 5.96	5.4 .227	4.5 .189	29.4 12.35	22.44 10.47	420 .588	1.12 .415	.319 .106	588 126	 462	60	26.89	20	48.2	132	9	7.6	90 84.74	4.76	3.33	.86	6.3
26	16 1325	99 2.62	86.9 2.30	35 4.65	8.3 .220	14.5 .384	41.2 10.91	19.99 9.33	328 .460	.901 .335	.239 .079	700 176	 324	100	24.05	21.1	42.6	114	9.6	16.7	89.5 85.6	4.22	3.07	.73	6.4
27	19 1220	12.6 3.07	10.4 2.54	36.9 4.50	8.8 .213	14 .342	45.6 11.14	20.10 9.38	405 .567	1.01 .376	.290 .097	550 185	 365	85	27.56	22.8	40.4	121	8.4	13.4	89.8 84.16	5.1	3.37	.88	6.5
Average	1520	2.84	2.28	5.07	.212	.261	11.17	20.57 9.60	355 .497	.992 .369	.291 .097	513 141	 372	80	25.4	20.4	45.4	124	9.3	14.4	89.26 85.94 90.38	4.44	3.3	.87	5.45

No. 31. Name, Mr. W. { Weight, Oct. 26.....69.730 k. " " 30.....69.000 Loss..... .730 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	100 N_2: SO_3.	100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	100 SO_3: Ethereal SO_3.	100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
October	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum.				
26	26 915	161.1 2.95	132.7 2.43	46.8 4.28	5.2 .092	3.3 .06	71.5 13.08	23.68 11.05	505 .707	1.24 .457	.453 .151	458 220	 238	35	22.5	18.5	32.7	121.4	3.9	2.5	84.6	5.4	3.5	1.2	5.3
27	20 1460	102.5 2.99	94.5 2.76	35.5 5.18	5.6 .164	2.9 .085	50.4 14.7	27.22 12.70	490 .686	1.31 .486	.476 .159	380 187	 193	35	20.3	18.8	35.2	108.4	5.9	3.1	90 87.1	4	3.3	1.1	4.5
28	18.5 1885	95 3.58	88.5 3.34	36.9 6.96	5.2 .194	4.5 .17	47.88 18.05	33.73 15.74	558 .781	1.55 .57	.537 .179	505 ...	....	10	19.9	18.5	38.6	107.2	4.5	5.1	91.1 87.2	4.3	3.2	1	4.3
30	24.5 1290	159 4.10	119.9 3.09	37.6 4.85	5.4 .137	3.8 .100	63.1 16.28	30.04 14.02	578 .809	1.50 .553	.527 .176	593 268	 325	15	25.2	18.9	29.9	132.7	4.5	3.2	91.5 86.2 91.1	4.9	3.4	1.1	4.4
Average	**1390**	**3.41**	**2.91**	**5.32**	**.147**	**.104**	**15.53**	**28.67** **13.38**	**533** **.746**	**1.40** **.517**	**.498** **.166**	**484** **225**	**252**	**24**	**22**	**18.7**	**34.1**	**117.4**	**4.7**	**3.5**	**86.25** **90.9**	**4.65**	**3.4**	**1.1**	**4.6**

No. 32. Name, Mrs. A. W.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, grms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, grms.	Uric acid, grm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2 : P_2O_5.	Ratios. 100 N_2 : SO_3.	Ratios. 100 N_2 : Cl_2.	Ratios. 100 SO_3 : P_2O_5.	Ratios. 100 SO_3 : Ethereal SO_3.	Ratios. 100 SO_3 : Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
March	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
2	17	95	83	27	6.5	....	43	22.9	285	.644	.280	350	....													
	1400	2.66	2.33	2.78	.182	....	12.11	10.70	.400	.239	.093	....	....	20	22	19.2	31.2	114	7.8	....	88.3	3.3	2	.66	5.7
3	18	120	99	31	6.2	....	48	22.4	271	.653	.257	460	....									91.6				
	1210	2.66	2.39	3.69	.150	....	11.59	10.46	.379	.243	.086	....	....	20	22.9	20.6	31.8	111	6.3	....	90.2	3.3	2.1	.73	3.7
4	16.5	102	88	26	6	....	45	21.8	310	.525	.261	437	....									93.5				
	1250	2.54	2.21	3.27	.150	....	11.30	10.22	.434	.195	.087	....	....	40	22.5	19.7	29	115	6.8	....	89.9	3.8	1.7	.66	3.9
5	19.5	117	102	36	7.7	....	47	21.9	273	.600	.282	480	....									93.7				
	1200	2.82	2.46	4.26	.185	....	11.45	10.22	.383	.223	.094	....	....	25	24.6	21.4	37.2	115	7.5	....	90.1	3.4	2	.82	3.7
6	14	97	78	22	6.5	...	43	21.5	312	.646	.271	333	....									93.5				
	1280	2.47	2.00	2.81	.166	....	11.02	10.03	.437	.240	.090	....	...	20	22.4	18.2	25.5	123	8.3	....	91	3.9	2.2	.82	2.1
7	19.5	135	114	36	7.5	....	55	20.6	262	.598	.262	338	....									94.9				
	965	2.61	2.20	3.43	.145	....	10.58	9.65	.366	.222	.087	....	....	5	25.6	20.8	32	119	6.6	....	90.5	3.5	2.2	.82	3.0
8	17	104	86	28	5.8	...	45	22.9	398	.615	.276	408	....									94				
	1275	2.65	2.20	3.62	.147	....	11.52	10.71	.557	.228	.092	....	....	30	23	19.3	31.5	120	6.7	....	90.5	4.9	2.0	.8	1.8
9	18	115	110	31	8	....	53	20.8	468	.568	.258	290	....									95.4				
	1035	2.38	2.27	3.21	.166	....	10.89	9.71	.655	.211	.086	....	....	20	21.9	20.8	29.5	105	7.3	....	89.1	6	2.0	.8	2.1
10	14	113	87	23	6.1	....	47	18.4	298	.561	.253	371	....									95.1				
	1020	2.30	1.76	2.79	.125	....	10.68	8.60	.517	.208	.084	....	....	7	21.5	17	26	130	7.1	....	88.9	4.3	1.9	.8	4.1
11	20	115	98	39.8	6.9	....	51	23.9	367	.674	.259	441	....									93.2				
	1225	2.81	2.39	5.37	.169	....	12.49	11.15	.514	.250	.086	....	....	20	22.5	19.1	43	118	7	....	89.3	4.1	2.0	.79	3.8
12	16	100	80	26.3	6.6	....	43	21.1	316	.688	.247	446	....									93.4				
	1275	2.55	2.05	3.30	.168	....	11.03	9.85	.442	.257	.082	....	....	20	23.1	18.6	30	124.4	8.2	....	89.3	4	2.3	.74	3.7
13	16.5	99	79	29	4.7	....	40	16.7	260	.540	.183	367	....									93.3				
	1080	2.13	1.70	3.13	.100	....	8.65	7.77	.364	.200	.061	....	....	7	24.6	19.6	36	119	6	....	89.8	4.2	2.5	.75	3.2
14	19.5	135	113	28.4	9.5	....	50	21.39	289	.617	.234	449	....									94				
	935	2.52	2.11	2.65	.177	....	10.52	9.98	.405	.230	.078	....	....	7	24	20.1	35	120	8.4	....	89.9	3.8	2.0	.74	3.6
15	17	108	87	37	7.2	....	46	18.6	365	.612	.228	430	....									93.7				
	1075	2.33	1.86	3.98	.154	....	9.85	8.67	.515	.227	.076	....	....	7	23.6	18.9	40	124	8.3	....	88.2	5.2	2.3	.78	3.5
																					93.4				
Average	1160	2.53	2.14	3.52	.156	....	10.99	21 9.84	319 .446	.614 .227	.255 .085	400	... .	18	23	19.4	32	118	7.3	....	89.4	4.05	2.06	.77	3.42
																					93.45				

No. 33. Name, MRS. R. { Weight, August 21.....40.860 k. " " 25.....41.224 k. Gain..... 364 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
August	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
21	14 1500	81 2.43	72 2.16	28.4 4.26	11 .330	3.7 .111	35.8 10.7	20.38 9.51	372 .52	.66 .24	.105 .035	456 216	 240	100	21.75	19.84	38.1	112.4	15.4	5.1	88.8 93.4	4.65	2.1	0.3	4.5
22	14 1350	85.5 2.31	70.8 1.91	27.7 3.74	11.8 .318	3.2 .086	36.8 9.94	19.00 8.87	.335 .47	.54 .20	.170 .057	421 213	 208	95	23.24	19.2	37.6	121	16.6	4.6	89.2 93.9	4.7	2	0.6	3.5
23	14.5 1390	87 2.42	71 1.83	27.7 3.84	10.6 .295	3 .083	36.3 10.08	19.24 8.98	306 .43	.54 .20	.175 .058	460 317	 143	100	24	18.1	38.1	132	16.1	4.6	89.13 93.43	4.3	2	0.58	4
24	14 1260	96.5 2.43	79 1.99	25.6 3.22	11.6 .292	2.2 .055	38.8 9.78	18.69 8.72	348 .49	.57 .21	.194 .065	443 171	 272	90	24.84	19.53	32.9	123	14.7	2.5	89.2 94.2	5	2.14	0.67	3
25	15 1475	84 2.48	72.4 2.14	32 4.72	6.8 .20	2.2 .065	37 10.90	20.62 9.62	378 .53	.62 .23	207 .069	460 260	 200	100	22.75	19.6	43.3	116	9.3	3	88.3 93.18	4.86	2.11	0.63	4.1
Average	1395	2.414	2	3.95	.28	.08	10.37	19.59 9.14	348 .49	.586 .219	.170 .057	448 235	 213	97	23.2	19.4	38	121	14	4	88.45 93.15	4.7	2.1	.56	4.2

No. 34. Name, Mrs. G. W. P. { Weight, November 20.....63.780 k. " " 23.....62.700 k. Loss..... ..... 80 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	100 N_2: SO_3.	100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	100 SO_3: Ethereal SO_3.	100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
November	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
20	18.5	104.7	78.3	41.2	9	5.3	41.3	21.03	303	.94	.408	477	....	100	27.6	19	50	132.9	11	6.4	85.2	4.8	3	1.2	5.8
	1395	2.90	2.184	5.75	.241	.140	11.52	9.81	.508	.35	.136	....	....									90			
21	18	106.5	78.5	35.5	8.4	5.3	41.16	15.94	277	.79	.331	375	....	80	25.9	19.05	43.1	135.9	10.7	6.5	85.07	4.43	3.3	1.3	5.9
	1065	2.27	1.67	3.78	.178	.110	8.77	7.44	.388	.29	.110	....	....									89.5			
22	19	115	89.6	39.1	12	5.8	45.1	20.29	300	.90	.368	450	....	150	25.5	19.9	43.4	128.1	13.1	6.4	86.83	3.87	3.3	1.1	4.9
	1210	2.78	2.17	4.73	.284	.140	10.91	9.47	.420	.34	.123	....	....									90.7			
23	22	130.5	92.5	39.1	10	6.5	48.7	16.97	270	.73	.399	397	....	75	26.6	19	40	140.9	10.6	6.8	85.62	4.08	2.9	1.4	6.0
	950	2.48	1.76	3.71	.191	.120	9.26	7.92	.378	.27	.133	....	....									89.7			
Average	1155	2.61	1.94	4.49	.223	.127	10.11	18.56 8.66	302 .423	.84 .31	.377 .126	 425	....	104	26.4	19.2	44	134.4	11.6	6.5	86.45	3.55	3.1	1.2	5.65
																						90			

No. 35. Name, Mrs. W. S. H. { Weight Dec. 30 .....52.800 k. " Jan. 2.....53.350 k. Gain..... 550 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 60 cc.	Neutral SO_3, mg. in 60 cc.	N_2, mg. in 5 cc.	Urea, grms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, grms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	100 N_2: SO_3.	100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	100 SO_3: Ethereal SO_3.	100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
Decemb'r	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
30	16.5 1825	92 3.36	84.5 3.08	34.74 6.34	5.6 .202	8.3 .303	41.7 15.22	28.35 13.25	475 .665	.912 .34	.200 .066	511 219	 292	55	22.1	20.3	41.6	109.1	6.5	9.8	87.1	5.45	2.3	.44	4.7
31	19 1620	109 3.53	93.7 3.04	33.68 5.45	6.3 .204	10 .320	48 15.55	29.16 13.70	447 .626	1.07 .4	.272 .091	499 201	 298	40	22.7	19.5	35.2	116.1	6.7	10.5	88.1	92.6 4.02	2.6	.58	4.7
January 1	19 1675	110 3.685	91.8 3.075	32.6 5.46	6.8 .227	10 .335	47.64 15.96	30.47 14.22	469 .657	.921 .34	.201 .067	576 368	 208	75	23.0	19.2	34.1	119.2	7.4	10.9	89.1	92.1 4.1	2.1	.42	4.3
2	18.5 1680	111 3.73	90.8 3.05	34 5.71	7.4 .240	9.6 .320	47 15.80	29.57 13.81	538 .753	.874 .323	.252 .084	605 309	 296	40	23.6	19.3	36.1	122	7.9	10.5	87.4	93.2 4.8 92.2	2.1	.54	5.2
Average	1702	3.58	3.06	5.71	.218	.319	15.63	13.74	482 .675	.940 .35	.231 .077	548 274	 274	52	22.9	19.6	36.8	116.6	7.1	10.4	87.91	4.59 92.5	2.3	.49	4.7

No. 36. Name, Miss F. { Weight, Aug. 9..... 50.830 k.
" " 14.....50.460 k.
Loss ..... 370 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, grm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	100 N_2: SO_3.	100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	100 SO_3: Ethereal SO_3.	100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
August	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
9	20 1225	11.6 2.84	96.9 2.35	24.9 3.05	8.6 .198	6.8 .167	47.6 11.66	22.49 10.49	319 .446	1.103 .41	.355 .118	490 201	 289	20	34.35	20.1	26.1	121	8.4	7.1	90.04	3.82	3.5	1	2.3
																					93.24				
11	18 1250	11.1 2.78	102.6 2.57	24.9 3.11	7 .175	4.2 .105	51.4 12.85	24.49 11.43	340 .476	1.06 .39	.400 .133	465 205	 260	60	21.63	20	24.2	108.2	6.8	4.1	88.94	3.7	3	1.02	3.34
																					92.64				
12	16 1370	95.5 2.62	88.9 2.44	27.7 3.79	5.7 .155	3.1 .085	45.6 12.49	24.04 11.22	340 .476	1.16 .43	.375 .125	466 318	 148	50	20.97	19.5	30.3	107.4	6.35	3.5	89.76	3.8	3.44	1	2
																					93.56				
13	18 1240	11.4 2.83	93.8 2.33	27.7 3.43	5.5 .136	3.2 .080	47.6 11.80	22.39 10.45	322 .450	1.07 .40	.414 .138	461 362	 99	70	23.78	19.75	29	121	5.8	3.4	88.5	3.8	3.4	1.1	3.15
																					92.35				
14	16 1410	98.5 2.78	81.7 2.30	33.4 4.71	6.2 .176	2 .056	40.7 11.49	22.32 10.42	322 .450	1.313 .42	.402 .134	507 333	 174	110	24.2	20	41	121	7.6	2.4	90.6	3.9	3.65	1.16	.7
																					94.5				
Average	**1300**	**2.77**	**2.40**	**3.62**	**.168**	**.099**	**12.06**	**23.14** **10.80**	**329** **.46**	**1.104** **.41**	**.389** **.129**	**478** **284**	.... **194**	**60**	**22.96**	**19.9**	**30**	**115.4**	**7**	**4.1**	**89.55**	**3.8**	**3.4**	**1.08**	**2.2**
																					93.35				

No. 37. Name, Miss F. { Weight, February 6.....52.780 k. " " 12.....53.000 k. Loss..... 220 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
February	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
6	12 1475	65 1.92	52.3 1.55	25.5 3.51	....	....	27 8.05	14.9 7.14	292 .409	....	.239 .079	237	....	18	23.9	19.2	43.6	124	....	....	86.7	5.1	....	.97	....
7	14 1625	75 2.54	64 2.08	22 3.57	....	....	32 10.42	18.9 8.85	312 .437	....	.325 .108	455	....	35	24.4	20	34.2	122	....	....	91.8 84.9	4.2	....	1	....
8	24.5 920	130 2.39	1.13 2.07	20 1.84	....	....	55 10.15	18.6 8.66	283 .390	....	.201 .067	423	.. . .	13	23.5	20.4	18	115	....	....	89.1 85.3	3.8	....	.7	....
9	14 1650	68 2.26	62 2.03	25 4.11	....	....	31.6 10.42	19.3 9.00	349 .489	....	.308 .103	429	....	13	21.7	19.5	40	111	....	....	89.1 86.4	4.7	....	1	....
10	16 1250	82 2.06	90 2.25	31 3.91	....	....	40 10.05	19.1 8.45	313 .438	....	.268 .089	412	....	45	20.5	22.4	38.9	91.6	....	....	91.1 84.1	4.4	....	.9	....
11	18 1215	100 2.43	88.3 2.15	36.2 4.40	....	... .	45 10.92	20.6 9.63	335 .469	....	.305 .102	449	....	35	22.2	19.7	40.3	113	....	....	88.5 88.2	4.3	....	.93	....
12	19.5 920	125 2.30	112.9 2.08	26.3 2.46	....	... .	54 9.92	18.6 8.71	311 .435	....	.227 .076	445	....	35	23.2	21	25	110	....	....	92.5 87.8	4.4	....	.8	...
																					92.2				
Average {	1280	2.27	2.03	3.54	....	....	9.99	18.49 8.63	314 .44	....	.268 .089	407	...	30	22.7	20.3	35.4	111	....	....	86.37	4.4	....	.89	....
																					90.77				

No. 38. Name, MR. P. E. { Weight, Dec. 21.....56.960 k. " " 25.....59.340 k. Gain..... 380 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	Per cent of total N_2. NH_3.	Per cent of total N_2. Kreatinin.	Per cent of total N_2. Uric acid.	Per cent of total N_2. Rest.
December	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
21	18	102	82	44	4.7	6.8	41.16	24.40	337	1.134	.338	473	....	20	24.7	19	53.3	124.4	5.7	18.6	87.8	3.7	3.2	.86	4.44
	1575	3.21	2.58	6.93	.146	.220	12.97	11.39	.471	.42	.113	258	215									91.5			
22	18	107.5	75.8	40.1	4.9	11.4	41	27.77	354	1.15	.375	595	....	25	26.2	18.9	49	138.2	6.4	11.5	89.4	3.4	2.9	.86	4.44
	1770	3.81	2.75	7.10	.175	.317	14.51	12.96	.496	.425	.125	403	192									92.8			
24	19	132.5	98.8	34.8	5	10.2	50.8	28.93	330	.944	.354	655	....	25	26	19.4	34.2	133.9	5.1	10.3	90	3.1	2.8	.79	3.8
	1475	3.91	2.915	5.13	.148	.300	14.99	13.5	.462	.35	.118	407	248									93.1			
25	18	130	91.4	34.44	5.6	11.2	49.7	30.42	346	1.15	.372	621	....	20	26.2	18.4	34.4	141.9	6.1	11.9	89.1	3.0	2.7	.77	4.43
	1600	4.16	2.927	5.51	.178	.350	15.91	14.17	.484	.425	.124	435	186									92.1			
Average	**1605**	**3.77**	**2.79**	**6.16**	**.162**	**.297**	**14.59**	**27.86 13.01**	**342 .479**	**1.09 .403**	**.360 .120**	**586 376**	**.... 210**	**22.5**	**25.8**	**18.9**	**42.7**	**134.6**	**5.8**	**10.5**	**89.1**	**3.3**	**2.8**	**.82**	**4.27**
																						92.4			

No. 39. Name, MR. C. { Weight, March 18..... 55.850 k.
" " 23..... 56.700 k.
Gain..... 850 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity.		Indican.	Ratios.						Per cent of total N_2.				
															100 N_2:			100 SO_3:						
												Mineral.	Organic.		P_2O_5.	SO_3.	Cl_2.	P_2O_5.	Ethereal SO_3.	Neutral SO_3.	Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
March	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated									Sum				
18	18 1510	115 3.47	91.9 2.78	37 5.68	9.8 .302	....	45 13.57	26 12.13	344 .481	.755 .28	.399 .133	709 353	 346	18	25.5	20.5	41.7	125	10.9	....	89.2	3.6	2	.92	4.3
19	16.5 1785	113 4.02	91.2 3.44	32 5.71	8.8 .313	... .	41 14.79	28.4 13.16	392 .550	.725 .27	.378 .126	767 364	 403	7	27.1	22	38	124	9.6	....	89.5	3.7	1.8	.89	4.1
20	18 1640	122.5 4.01	91.8 3.01	34 5.53	9.3 .306	....	45.9 15.05	29.2 13.65	387 .532	.820 .305	.392 .131	771 354	 417	7	26.7	20	37	133	10.1	....	90.7	3.6	2.3	.87	2.5
21	19.5 1180	140 3.30	125.3 2.95	36 4.27	12.9 .299	....	57.1 13.50	26.1 12.20	387 .532	.755 .28	.342 .114	667 391	 276	7	24.4	21.8	32	112	10	...	90.4	4	2.1	.84	2.7
22	13 2255	85 3.80	62.6 2.82	23 5.19	6.7 .304	....	34.7 15.80	29.8 13.90	406 .568	.850 .316	.437 .146	676 276	 400	18	24	18	33	134	10.8	....	88.75	3.6	2	.92	4.7
23	14 2475	75 3.71	61.9 3.05	35 8.61	6.7 .332	....	30.9 15.30	29.8 13.86	428 .600	.950 .350	.438 .146	742 401	 341	15	24.2	20	56	122	10.9	....	90.6	3.9	2.3	.96	2.2
Average	1800	3.72	3.01	5.83	.309	....	14.67	13.15	.544	.81 .300	.405 .135	722 364	 358	12	25.3	20.5	40	123	10.2	....	89.6 93.3	3.7	2	.92	3.8

No. 40. Name, Mrs. E. M.—Weight about 80.300 k.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
January	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
9	14 1540	58 1.78	68.1 2.10	31.24 4.81	3.2 .114	5.5 .170	31.22 9.61	18.30 8.64	61.6 .086	.755 .28	.191 .063	228 6	 222	30	18.6	21.2	50	84.8	5.4	8.1	89.9 / 90.8	0.9 / 0.8	2.9	.66	5.64
10	15 1540	65 2.00	69.5 2.14	31.24 4.81	3.7 .114	6.5 .200	34.16 10.52	20.17 9.37	61.6 .086	.755 .28	.144 .048	333 54	 279	35	19	20.3	45.8	93.5	5.3	9.3	89.1 / 89.9	0.8 / 0.95	2.7	.46	6.94
11	15 1560	70 2.18	68 2.12	31.2 4.86	3.5 .120	5.6 .176	35.56 11.00	20.74 9.68	74.9 .105	.733 .27	.192 .064	337 299	 38	30	19.8	19.9	48.6	102.8	5.7	8.3	88.05 / 89	0.95 / 1.1	2.5	.60	7.9
12	16.5 1440	80 2.30	71.1 2.05	26.98 4.00	3.7 .100	6.3 .180	38.26 11.02	20.76 9.70	86.4 .121	.77 .28	.135 .045	330 202	 128	40	19	18.7	36.4	112.1	5.3	8.8	88.0 / 89.1	1.1 / 1.1	2.6	.40	7.9
13	15.5 1480	78.5 2.32	70.3 2.08	26.98 4.1	3.5 .111	4.7 .140	39.5 11.69	22.1 10.32	88.8 .124	.74 .275	.205 .068	426 219	 207	40	19.8	17.8	35.0	111.2	5.3	6.7	88.3 / 89.4	1.1	2.4	.58	7.62
Average	1512	2.12	2.1	4.5	.114	.173	10.77	20.40 9.54	74.6 .103	.75 .277	.173 .055	331 156	... 175	35	19.3	19.6	43.1	101	5.4	8.2	88.7 / 89.7	0.97	2.6	.54	7.2

No. 41. Name, MR. S. { Weight, April 8.....67.200 k.
" " 14.....67.200 k.
0

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
April	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
8	22.5 1280	148 3.78	117.6 3.01	36.2 4.63	9 .23	... .	60.6 15.5	28.60 13.35	461 .645	1.415 .527	.53 .18	553 251	 302	90	24.4	19.4	30	125	7.6	...	86	4.1	3.4	1.1	5.4
9	25 1215	167 4.06	130.7 3.18	46.9 5.68	13.8 .335	17.9 .434	68.2 16.58	30.99 14.46	447 .626	1.46 .54	.62 .21	627 286	 341	90	24.5	19.1	34	127	10.6	13.6	87.3 (90.1)	3.9	3.3	1.2	4.3
10	20 1525	131 4.00	101 3.08	41.2 6.28	10.4 .317	17 .520	49.7 15.16	28.50 13.30	433 .607	1.4 .52	.52 .18	634 259	 375	75	26.3	20.4	41	129	10.3	16.7	87.8 (91.2)	4	3.4	1.2	3.6
11	29 1120	218 4.82	150.7 3.38	43.3 4.84	16.5 .369	19.7 .441	88 19.7	36.58 17.07	596 .827	1.93 .72	.72 .24	941 376	 565	75	24.5	17.1	25	142	10.9	13	86.7 (91.8)	4.2	3.5	1.2	4.4
13	30.5 1040	235 4.89	177 3.68	48.3 6.76	16.5 .343	13.6 .283	97 20.2	37.52 17.51	620 .87	1.79 .67	.58 .19	915 295	 620	50	24.2	18.2	33.5	133	9.3	7.5	86.7 (90.9)	4.3	3.3	.9	4.8
14	24.5 1190	147 3.50	129.4 3.08	52.7 6.27	12.5 .296	....	68.6 16.3	30.15 14.07	481 .67	1.45 .54	.53 .18	600 209	... 391	100	21.4	18.9	38	113	9.6	....	86.3 (91 / 90.4)	4.1	3.3	1.1	5.2
Average	1230	4.175	3.235	5.74	.315	.419	17.24	32.06 14.96	505 .701	1.58 .586	.59 .197	711 279	 431	80	24.2	18.9	33.3	129	9.7	12.9	86.37 (90.44)	4.07	3.4	1.14	5

(848)

No. 42. Name, MR. S. { Weight, July 7.....40.100 k. " " 17.....41.200 k. Gain..... 1.100 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, grms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	100 N_2: SO_3.	100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	100 SO_3: Ethereal SO_3.	100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
July	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
7	25	142.5	127	40.5	9.4	16.8	66.6	33.27	647	.75	.338	534	....	120	21.4	19.1	24.7	112	7.4	13.2	87.95	5.3	1.6	.65	4.5
	1325	3.77	3.37	4.37	.249	.445	17.66	15.53	.904	.28	.113	424	107									93.08				
8	22	127.5	109	42.6	7	14	57.8	27.32	509	.64	.441	479	....	120	22	18.8	36.8	117	6.4	12.8	87.34	4.91	1.63	1.01	5.1
	1260	3.20	2.75	5.37	.176	.353	14.60	12.75	.713	.24	.147	156	323									92.25				
10	25	145	132	44.7	13.4	14	66	29.77	486	.678	.494	528	....	150	21.9	19.8	33.7	110	10.1	10.6	88.5	4.31	1.6	1.05	4.6
	1190	3.45	3.14	5.32	.319	.333	15.70	13.89	.68	.253	.165	....	....									92.8				
11	26	132.5	130	47.6	14	....	69	24.80	353	.633	.441	372	....	200	19.2	18.8	34.3	102	10.7	....	87.44	3.74	1.9	1.11	5.8
	960	2.54	2.50	5.57	.269	....	13.25	11.57	.494	.254	.147	....	....									91.2				
12	25	165	124.5	32.7	7.9	....	62	23.68	412	.673	.408	449	....	125	26.6	20.1	26.3	132	6.3	....	87.74	4.56	2	1.08	4.6
	1020	3.36	2.54	3.33	.161	....	12.60	11.05	.577	.250	.136	....	....									92.3				
13	24	133	113	45.4	6.6	7	57.3	....	....	.66	.477	319	....	100	23.2	19.7	39	118	6	5.3	....	....	1.8	1.14	5.13
	1210	3.22	2.74	5.50	.160	.169	13.9	....	....	.245	.159	....	....									91.9				
14	24	154	118	42.7	8.1	11.3	62.5	27.62	638	.68	.410	384	....	40	24.6	18.8	34.1	131	7	9.7	85.93	6	1.7	.91	5.5
	1200	3.70	2.83	5.12	.194	.271	15.00	12.89	.893	.253	.137	. ..	....									91.93				
15	24	124	95.4	85.2	8.8	6.6	50	....	....	.70	.476	340	....	75	20.8	19.1	85.2	109	9.2	7	....	....	1.7	1.05	5.1
	1520	3.16	2.90	12.95	.267	.203	15.20	....	....	.26	.159	....	....									92.6				
17	21	95	75	79.5	5.4	....	36.7	....	....	.61	.319	....	....	100	25.9	20.4	108.3	127	7.2	....	....	....	2	.94	5.6
	1540	2.90	2.31	12.20	.166	....	11.30	....	....	.227	.106	....	....									91.45				
Average	1247	3.26	2.79	4.94	.218	.296	14.36	30.77	509	.678	.474	426	....	113	22.8	19.4	46.1	117	7.8	9.7	87.48	4.8	1.8	1	5.1
								12.95	.713	.251	.158	290	215									92.17				

No. 43. Name, Mr. S.—Continued.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	100 N_2: SO_3.	100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	100 SO_3: Ethereal SO_3.	100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	Per cent of total N_2. NH_3.	Per cent of total N_2. Kreatinin.	Per cent of total N_2. Uric acid.	Per cent of total N_2. Rest.
July	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
18	13.5 2400	68.5 3.29	57.5 2.76	38.3 9.19	5.1 .245	4.3 .206	29.5 14.18	25.80 12.04	710 .994	.63 .23	.345 .115	....	....	90	23.2	19.46	64.8	119	8.8	7.5	84.94 7 / 91.9	5.76	1.62	.8	5.7
19	14.5 1340	85 2.28	70.2 1.88	26.3 3.52	5.6 .150	5.4 .145	36 9.64	17.94 8.37	397 .555	.52 .19	.247 .082	268	....	75	23.65	19.5	36.5	121	8	7.7	86.84 / 92.6	5.76	2	.85	4.5
20	15 1290	81 2.09	69 1.79	34.1 4.40	7.5 .194	4 .103	36.4 9.39	16.65 7.77	645 .90	.50 .186	....	....	....	100	22.2	19	46.8	117	10.9	5.7	82.7 / 92.3	9.6	2	.87	4.8
21	13 2240	80 3.58	60 2.88	29.8 6.67	5 .224	8.2 .367	31.5 14.11	23.18 10.35	1814 2.54	.42 .163	....	....	....	40	25.37	20.4	47.3	124	8.3	12.8	73.34 / 92	18.66	1.1	.87	6.1
22	 1580	122 3.86	98 3.09	35.5 5.61	7 .221	7.5 .237	53.5 16.91	29.27 13.66	1118 1.57	1.39 .517	....	....	....	50	22.8	18.3	32.2	125	7.1	7.7	80.8 / 90.7	9.27	3	.87	5.5
Average	**1770**	**3.03**	**2.48**	**5.88**	**.207**	**.212**	**12.85**	**22.37** **10.44**	**937** **1.31**	**.69** **.257**	....	....	....	**70**	**23.6**	**19.3**	**46**	**122**	**8.3**	**8.5**	**81.2** / **91.4**	**10.2**	**2**	**.8**	**5.8**

No. 44. Name, MR. N. G. { Weight, April 19.....64.500 k. " " 25.....65.200 k. Gain..... 700 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, grms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, grms.	Uric acid, grm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
April	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
19	17.5 1695	97.5 3.31	75.3 2.55	37 6.25	6.4 .217	7.5 .253	36 12.24	23.34 10.89	278 .389	.881 .328	.337 .112	542 251	 291	60	26.6	20.8	51	129	8.5	9.9	89	28	2.7	.78	4.7
20	18.5 1625	120 3.90	94 3.05	28 4.62	8 .260	8.2 .266	45 14.56	27.34 12.76	338 .473	1.023 .38	.387 .129	650 358	 292	50	26.8	20.9	32	128	8.5	8.7	91.8 88.75	3.25	2.6	.79	4.6
21	18 1780	110 3.90	84 2.98	32 5.69	9.8 .347	9 .320	44 15.84	30.00 14	356 .498	.925 .344	.410 .137	640 271	 369	25	24.7	18.8	36	131	11.6	10.7	92 88.4	3.1	2.2	.75	5.55
22	27 910	180 3.27	134 2.43	39 3.55	14 .255	....	68 12.4	23.46 10.95	306 .428	.99 .34	.348 .116	546 298	 248	5	26.3	19.6	29	130	9.5	....	91.5 88.3	3.4	2.8	.86	4.6
23 Days 14 hrs.	26 1710	195 6.67	144 4.92	30 5.13	13 .453	5.6 .191	71.4 24.42	46.24 21.58	636 .890	1.79 .67	.650 .216	1122 601	 521	50	27.3	20.1	21	135	9.2	4	91.7 88.4	3.7	2.7	.88	4.3
24 Nights 10 hrs.	17.5 3095	88 5.45	75 4.65	30 9.42	5.6 .343	5.8 .359	39 24.33	46.50 21.7	545 .763	1.55 .575	.550 .183	866 384	 482	60	22.4	19.1	39	117	7.3	7.7	92.1 89.4	3.1	2.37	.75	4.4
25																					92.5				
Average	1545	3.79	2.94	4.95	.268	.198	14.83	28.14 13.13	351 .49	1.01 .377	.38 .127	623 309	 314	36	25.55	19.8	33.4	129	9.1	6.7	88.7 92	3.3	2.55	.86	4.6

No. 45. Name, MR. S. { Weight, March 30.....59.700 k.
" April 2.....59.800 k.
Gain..... 100 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. N/10	Kreatinin, gms.	Uric acid, grn.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
March	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
30	20 / 1200	129 / 3.10	117.5 / 2.81	43 / 5.20	8.7 / .209	.... /	57 / 13.61	25.2 / 11.70	523 / .732	1.19 / .44	.354 / .118	552 / 230	.... / 322	46	22.8	20.7	38	110	7.4	....	86.5	5.3	3.25	.85	4.1
31	17 / 1565	95 / 2.97	86 / 2.69	37.6 / 5.88	8.1 / .253	.... /	43 / 13.61	25.2 / 11.70	488 / .683	1.05 / .39	.357 / .119	501 / 183	.... / 318	13	21.6	19.6	43	110	9.4	....	91.8 / 86.8	5	2.8	.87	4.5
April 1	18.5 / 1340	120 / 3.12	105.4 / 2.82	30.5 / 4.69	8.8 / .237	.... /	53 / 14.18	26.9 / 12.60	541 / .757	1.03 / .38	.284 / .095	536 / 174	.... / 362	25	21.9	19.9	33	110	8.4	....	91.8 / 88.6	5.3	2.7	.66	2.24
2	18 / 1460	102.5 / 2.99	89 / 2.60	32.6 / 4.76	7 / .204	.... /	48.9 / 14.27	26.1 / 12.20	508 / .711	1.12 / .42	.355 / .118	511 / 190	.... / 321	40	20.9	18.2	33	115	8	....	93.9 / 85.6	5	2.9	.8	5.7
Average	1390	3.04	2.73	513	.226	....	13.94	25.9 / 12.05	515 / .721	1.09 / .410	.336 / .112	525 / 194	331	29	21.8	19.06	36.9	111	8.2	....	90.6 / 86.7 / 91.8	5.1	2.9	.8	4.5

No. 46. Name, Miss E. B.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. N/10	Kreatinin, gms.	Uric acid, gm.	Acidity.		Indican.	Ratios.						Per cent of total N_2.				
															100 N_2 :			100 SO_3 :							
												Mineral.	Organic.		P_2O_5.	SO_3.	Cl_2.	P_2O_5.	Ethereal SO_3.	Neutral SO_3.	Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
October	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated									Sum				
18	16.5	85	76.1	35.5	4.8	2.9	37	18.27	461	.853	.244	341	....	40	23	20.6	48.1	111.6	6.3	4.0	85.3	6.45	3.2	.80	3.7
	1355	2.30	2.06	4.81	.130	.080	10	8.53	.645	.32	.081	....	....								91.8				
19	16	75	61.9	29.5	4	4.1	32.5	....	....	.863	.216	....	....	35	23.2	19.1	43.5	121.2	6.5	6.3	. .	....	3.1	.68	4.0
	1630	2.45	2.02	4.61	.132	.130	10.6	....	....	.32	.072	....	....								92.2				
Average	1492	2.37	2.04	4.71	.131	.105	10.3	18.27 8.53	461 .645	.858 .32	.228 .076	341 ..	....	37.5	23.1	19.8	45.8	116.4	6.4	5.2	85.3	6.45	3.4	.74	3.85
																					92				

No. 47. Name, MR. C. E. C.

2 Kilos Liquid Food + 900 cc. water.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2 : P_2O_5.	Ratios. 100 N_2 : SO_3.	Ratios. 100 N_2 : Cl_2.	Ratios. 100 SO_3 : P_2O_5.	Ratios. 100 SO_3 : Ethereal SO_3.	Ratios. 100 SO_3 : Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
May	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										+				
27	23.5 1450	179 5.19	124 3.61	40.5 5.85	20.5 .594	9.5 .276	63 18.27	32.30 15.07	1081 1.51	.967 .36	.458 .153	1077 249	 828	50	28.4	19.7	32	144	16.4	7.7	82.48	7.07	1.95	.83	7.7
28	22 1615	114 3.68	104 3.34	45 7.22	14.5 .468	14 .452	52 16.82	30.00 13.97	788 1.103	1.05 .39	.485 .162	614 212	... 402	85	21.9	19.8	43	109	14.	13.5	89.55 83.18	6.56	2.31	.96	7.
29	225 1450	133 3.86	117 3.39	36 5.25	12.3 .357	19 .554	60 17.40	31.07 14.48	690 .966	1.054 .39	....	783 278	 505	60	22.2	19.5	30	114	10.5	13.4	89.74 83.22	5.55	2.25	.8	8.2
30	245 1515	135 4.09	1036 3.14	44 6.67	10.6 .321	7.8 .236	55 16.06	29.50 13.76	612 .86	1.083 .40	....	788 350	 438	40	25.5	19.55	41.5	130.2	10.2	7.5	88.77 85.7	5.14	2.51	.8	5.85
31	25 1430	146 4.18	110 3.14	41 5.89	10. .286	15. .429	57.7 16.49	31.15 14.53	549 .77	1.014 .38	....	801 303	 498	90	25.3	19.	35.7	133	9.1	13.6	90.84 88.03	4.63	2.29	.8	4.2
2 Days 14 hrs.	24 1500	177 5.32	120 3.60	35 5.22	11.2 .337	16 .480	62.6 18.78	34.29 16.03	636 .89	1.34 .50	....	1020 522	 498	120	28.3	19.2	27.9	148	9.36	13.3	92.7 85.46	4.74	2.65	.8	6.75
3 Nights 10 hrs.	18 1675	90 3.02	75 2.52	44 7.32	7.2 .241	7.4 .248	40.9 13.70	25.30 11.78	436 .61	.81 .31	.293 .098	543 100	.. 443	140	23.4	18.46	53.3	127	9.6	9.8	90.2 85.95	4.45	2.23	.72	6.65
Average 7 days.	**1519**	**4.19**	**3.25**	**6.20**	**.372**	**.382**	**16.79**	**30.55** **14.26**	**684** **.958**	**1.045** **.389**	... .	**801** **289**	**512**	**85**	**24.8**	**19.36**	**36.6**	**129**	**11.4**	**11.8**	**90.4** **84.93** **90.63**	**5.7**	**2.3**	**.8**	**6.3**

No. 48. Name, MR. C. { Weight, January 25.....75.300 k.
" February 1.....75.240 k.
Loss.....60 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	Per cent of total N_2. NH_3.	Per cent of total N_2. Kreatinin.	Per cent of total N_2. Uric acid.	Per cent of total N_2. Rest.
January	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated									Sum				
25	24	160	137	45.5	....	...	71	29.06	443	....	....	662	....								87.7	4	....	....	....
	1085	3.47	2.97	4.93	....	....	15.46	13.56	.62	....	....	....	....	60	22.4	19.2	31.8	117	....	....					
26	18.5	129	105	35.5	....	....	54	30.60	414	....	.540	720	....								91.7				
	1500	3.87	3.14	5.32	....	....	16.08	14.28	.579	....	.180	....	....	80	24	19.5	33	123	....	....	88.8	3.6	....	1.1	....
27	20	127	101	44	....	....	54	31.22	403	...	....	775	....								92.4				
	1550	3.94	3.13	6.82	....	....	16.76	14.57	.564	....	.5	.. .	....	100	23.4	18.7	40.6	126	....	....	87	3.4	....	....	....
28	19	140	118	36.5	....	....	60	29.99	403	....	....	755	....								90.4				
	1325	3.71	3.12	4.84	....	....	15.98	13.95	.564	....	....	....	....	100	23.2	19.5	30.2	119	....	....	87.3	3.5	....	....	....
30	20	123	98	38	....	....	52	29.42	506	....	....	695	....								90.8				
	1580	3.89	3.08	6.00	....	....	16.49	13.73	.708	....	....	....	....	65	23.5	18.7	36	126	....	....	88.3	4.3	....	....	....
31	20.5	135	110	42	...	....	58	30.47	383	....	.623	696	....								87.6				
	1480	3.91	3.18	6.07	....	....	16.68	14.22	.536	....	.208	....	....	30	23.5	19	36	123	....	...	85.3	3.2	....	1.2	....
February 1	20	134	116	38	....	....	58	....	352	....	.577	660	...								88.5				
	1375	3.69	3.20	5.27	....	....	15.82	....	.493	....	.192	....	....	30	23.3	20.2	33	115	....	....		3.1	....	1.2	....
Average	1425	3.78	3.12	5.61	....	....	16.18	30.11 14.05	415 .581	....	.580 .193	707	....	60	23.35	19.26	34.5	121	....	....	86.2 88.05	3.6	....	1.2	....

No. 49. Name, MRS. E. D. { Weight, Dec. 13.....48.025 k. " " 16.....47.800 k. Loss..... 225 g.

1902. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, grm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	Per cent of total N_2. NH_3.	Per cent of total N_2. Kreatinin.	Per cent of total N_2. Uric acid.	Per cent of total N_2. Rest.
December	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
13	17.5	92.5	82	30.8	....	....	41.8	19.78	422	....	....	384	....	36	22.1	19.6	36.6	112.3	....	....	86.3	5.5	....	....	....
	1280	2.37	2.10	3.92	....	....	10.70	9.23	.590	....	....	....	....									91.8			
14	14	87.5	72	33.2	....	....	36	19.95	399	....	....	470	....	50	24.1	20	46	121	....	....	87.63	5.27	....	....	....
	1470	2.57	2.12	4.88	....	....	10.63	9.31	.559	....	....	....	....									92.9			
15	14	92.5	79	30	7.5	....	40.3	16.52	305	....	....	387	....	50	23.1	19.7	37.3	116	9.05	...	88.9	4.9	....	....	....
	1075	2.00	1.70	3.23	.161	. ..	8.67	7.71	.427	....	...	....	....									93.8			
16	15	105	83	32	8	....	43	19.78	380	....	....	462	....	100	24.5	19.5	37.4	126	7.7	....	85.5	4.7	....	....	....
	1320	2.77	2.20	4.23	.212	....	11.31	9.66	.530	....	.. .	....	. ..									90.2			
Average	1286	2.43	2.03	4.07	....	....	1043	19.24	376	....	....	426	....	60	23.3	19.46	39	119	8.4	....	86.1	5	....	....	....
								8.98	.526	....	....	....	....									91.1			

No. 50. Name, MR. W. { Weight, Nov. 29.....55.950 k. " Dec. 5.....57.410 k. Gain..... 1.460 g.

1902. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, grms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, grms.	Uric acid, grm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
November	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated										Sum				
29	16 / 1760	83 / 2.90	80 / 2.80	70.4 / 10.52	.... / ...	.... /	37 / 13.06	24.08 / 11.24	594 / .83	.... /	.... /	535 /	.... /	....	22.2	21.4	80.5	103.5	....	....	86.06	6.4	....	....	....
30	15.5 / 1790	90 / 3.22	47 / 2.78	55.6 / 9.95	.... /	.... /	38 / 13.68	24.88 / 11.61	687 / .96	.... /	.... /	602 /	.... /	....	23.5	20.3	72.9	116	....	....	92.46 / 84.9	7	....	....	....
December 1	20.5 / 1290	128 / 3.32	109 / 2.81	62 / 7.98	... /	.... /	54 / 13.80	25.84 / 12.06	573 / .80	.... /	.... /	593 /	.... /	....	24	20.3	58	119	....	....	91.9 / 87.4	5.8	....	....	...
2	15 / 1875	90 / 3.38	75 / 2.83	35.2 / 6.60	.... /	.... /	39 / 14.86	27.73 / 12.94	622 / .87	.... /	.... /	562 /	... /	....	22.8	19	45	119	....	....	93.2 / 87.1	5.8	....	....	....
3	26 / 900	145 / 2.61	138 / 2.48	51.2 / 4.62	.... /	.... /	63 / 11.43	21.02 / 9.81	396 / .514	.... /	.... /	414 /	.... /	....	22.8	21.7	40.4	105	....	....	92.9 / 85.8	4.5	....	....	....
4	21 / 1690	108 / 3.65	93.7 / 3.17	44.8 / 7.59	.... / .262	.... /	47 / 15.98	29.79 / 13.90	608 / .85	.... /	.... /	490 /	.... /	....	22.8	19.8	41.2	115	8.2	....	90.3 / 87	5.3	...	....	....
5	19.5 / 1275	116 / 2.94	69 / 1.75	54 / 6.91	.... /	.... /	51 / 12.99	25.01 / 11.67	364 / .509	.... /	.... /	471 /	.... /	23	22.6	....	53.2	....	....	....	92.3 / 89.8	3.9	....	....	....
																					93.7				
Average	1511	3.14	2.66	7.74	....	....	13.70	25.48 / 11.89	548 / .767	.... /	.... /	524 /	.... /	....	22.9	19.3	54	118	....	....	86.8 / 92.4	5.6	....	....	....

No. 51. Name, MR. B.—Weight about 70 kilos.

1902. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	Per cent of total N_2. NH_3.	Per cent of total N_2. Kreatinin.	Per cent of total N_2. Uric acid.	Per cent of total N_2. Rest.
December	cc. in 24°	Total	Total	Total			Total	N. Total	N. Total		N. Total	Titrated									Sum				
13	28 1250	191 4.77	154 3.87	42 5.30	....	....	79 19.7	35.68 16.15	530 .74	....	....	775		25	24.2	19.6	26.7	123.4	...	....	84.5	3.7	....	....	....
14	24 1330	185 4.92	144 3.83	38.8 5.17	....	... .	75 19.96	36.85 17.2	669 .936	....	....	756		50	24.7	19.2	25.9	128.5	....	....	88.2 86.1	4.7	....	....	....
15	22.5 1380	160 4.41	126 3.50	42.4 5.85	....	....	67 18.51	33.42 15.58	618 .865	....	....	814		45	23.8	18.9	31.6	129.1	....	....	90.8 84.23	4.67	....	....	....
17	24 1350	170 4.59	131.8 3.56	44 5.94	....	....	68 18.26	34.06 15.88	567 .794	....	....	810		19	25.1	19.4	32.5	129.	....	....	88.9 87.	4.3	....	....	....
18	25 1325	172 4.57	129 3.43	46.8 6.22	....	....	67. 17.88	33.22 15.49	578 .809	....	....	768		19	25.5	19.2	34.8	133.	....	....	91.3 86.6	4.5	....	....	....
19	29. 1050	197 4.14	170 3.58	48 5.07	....	....	86 18.02	33.42 15.58	533 .746	....	....	756		10	22.9	19.8	28.1	116.	....	....	91.1 86.55	4.15	....	...	....
20	27 1040	198 4.12	153 3.18	48.8 5.09	....	... .	81 17.06	31.71 14.77	549 .769	....	....	769		14	24.2	18.7	29.9	129.	....	....	90.7 86.9 91.6	4.7	....	....	....
Average	1246	4.50	3.56	5.52	....	...	18.48	34.06 15.88	578 .81	....	....	779		24	24.3	19.25	30.1	126.4	....	....	85.75 90.15	4.4	....	....	....

No. 52. Name, Mrs. I. M. { Weight, Dec. 13.....57.200 k. " " 20.....57.650 k. Gain..... 450 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, gms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, gms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	Per cent of total N_2. NH_3.	Per cent of total N_2. Kreatinin.	Per cent of total N_2. Uric acid.	Per cent of total N_2. Rest.
February	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated									Sum				
21	12 1835	67 2.48	53 1.96	26 4.81	....	....	30 10.89	21.3 9.56	293 .410	....	.302 .100	420	....	3	22.8	18	41.4	126	....	....	87.83	3.67	....	.92	....
22	17 1280	84 2.15	73 1.85	30 3.90	....	... .	36 9.31	17.5 8.13	307 .430	... .	.358 .119	384	....	16	24.2	19.9	42	116	....	....	91.5 87.3	4.6	....	1.3	....
23	17 1280	87 2.24	87 2.23	25 3.18	... .	....	42 10.75	20.2 9.40	296 .414	....	.325 .108	397	....	16	20.8	20.7	29.6	100	....	....	91.9 87.43	3.87	....	1	....
24	16 1125	100 2.25	84 1.89	25 2.92	... .	....	43 9.73	16.9 8.33	306 .430	....	.254 .085	421	....	16	23.1	19.4	30	119	....	....	91.3 85.6	4.4	....	.9	....
25	17.5 1065	110 2.34	92.4 1.97	32 3.40	... .	....	49 10.51	19.4 9.06	340 .476	....	.316 .105	405	....	8	22.2	19	32.3	119	....	....	90 86.27 90.8	4.53	....	1	....
Average	1337	2.29	1.98	3.64	....	....	10.24	19.05 8.89	308 .431	....	.309 .103	405	....	10	22.36	19.3	35.5	116	....	....	86.9 91.1	4.2	....	1	. .

No. 53. Name, MR. W. { Weight, February 16.....70.100 k.
" " 26.....71.560 k
Gain ..... 1.460 g.

1903. 24 hours ending	Sp. gr.	P_2O_5, mg. in 50 cc.	SO_3, mg. in 50 cc.	Cl_2, mg. in 10 cc.	Ethereal SO_3, mg. in 50 cc.	Neutral SO_3, mg. in 50 cc.	N_2, mg. in 5 cc.	Urea, grms.	NH_3, cc. $\frac{N}{10}$	Kreatinin, grms.	Uric acid, gm.	Acidity. Mineral.	Acidity. Organic.	Indican.	Ratios. 100 N_2: P_2O_5.	Ratios. 100 N_2: SO_3.	Ratios. 100 N_2: Cl_2.	Ratios. 100 SO_3: P_2O_5.	Ratios. 100 SO_3: Ethereal SO_3.	Ratios. 100 SO_3: Neutral SO_3.	Per cent of total N_2. Urea.	NH_3.	Kreatinin.	Uric acid.	Rest.
February	cc. in 24°	Total	Total	Total	Total	Total	Total	N. Total	N. Total	N. Total	N. Total	Titrated									Sum				
16	19	90	88.6	40	....	....	40	26.3	479	....	.492	634	....	....	22.3	22	49	101	....	....	86.3	4.7	....	1.1	....
	1760	3.17	3.12	6.84	....	....	14.22	12.27	.67	....	.164	....	....								91				
17	19	111	86.8	31	....	....	43	24.3	397	....	.598	604	....	....	25.7	20.1	36	128	....	....	85.1	4.1	....	1.5	....
	1550	3.44	2.69	4.84	....	....	13.37	11.37	.56	....	.199	....	....								89.2				
18	18	100	81.2	34	....	....	41	30.00	379	....	.730	731	....	....	24.2	19.8	41	122	....	....	87.25	3.25	....	1.5	....
	1975	3.95	3.20	6.72	....	....	16.30	14.22	.53	....	.243	....	....								90.5				
19	20	120	95	36	....	....	47	27	288	....	.328	660	....	....	25.2	20.2	39	126	....	....	89.3	2.9	....	.8	....
	1500	3.60	2.85	5.42	....	....	14.07	12.56	.40	....	.109	....	....								92.2				
20	18	120	86	31	....	....	44	26	347	....	.363	740	....	....	27.3	19.6	35	140	....	....	86.66	3.44	....	.9	....
	1610	3.86	2.77	5.02	....	....	14.11	12.23	.49	....	.121	....	....								90.1				
21	18.5	125	92	29	....	....	45.5	26.5	323	....	.404	732	....	....	27.6	20.3	32	136	....	....	89.3	3.2	....	.98	....
	1525	3.81	2.80	4.42	....	....	13.87	12.37	.45	....	.135	....	....								92.5				
22	18.5	128	95	21	....	...	49	29.6	364	....	.773	845	....	....	25.2	19	21	134	....	....	86.9	3.1	....	1.6	....
	1625	4.14	3.08	3.46	....	....	16.41	14.25	.51	....	.258	....	....								90				
23	24	162	109	34	....	....	57	29.3	333	....	.737	795	....	....	25.9	18.4	18	140	....	....	87.8	2.9	....	1.6	....
	1325	4.04	2.89	4.52	....	....	15.68	13.77	.47	....	.245	....	....								90.7				
24	19	116	84	37	....	....	44	31.5	408	....	.416	830	....	....	24.9	20	41.8	125	....	....	87.7	3.4	....	.8	....
	1890	4.16	3.34	6.99	....	....	16.75	14.68	.57	....	.139	....	....								91.1				
25	17	96	74.1	37	....	....	37	27.5	306	....	.678	710	....	....	26.2	20.2	50.8	129	....	....	88.6	3	....	1.6	....
	1975	3.79	2.93	7.30	....	....	14.48	12.83	.43	....	.226	....	....								91.6				
26	18.5	111	86.7	37	....	....	42	29.1	336	....	.405	785	....	....	26	20.1	43.6	128	....	....	89	3	....	.9	....
	1825	4.07	3.16	6.86	....	...	15.70	13.97	.47	....	.135	....	....								92				
Average {	1690	3.82	2.99	5.90	....	....	14.99	28.16 / 13.14	360 / .504	.... /	.538 / .179	733	....	....	25.48	20	39.3	127.8	....	....	87.66 / 91.02	3.36	....	1.17	...

No. 54. Name, MR. W. F.

1904. 24 hours ending	Cc. in 24°.	Sp. gr. 1.0—	N_2. Mg. in cc.	N_2. Total gm.	P_2O_5. Mg. in 50 cc.	P_2O_5. Total gm.	SO_3. Mg. in 50 cc.	SO_3. Total gm.	Ratios. 100 N_2 : P_2O_5.	Ratios. 100 N_2 : SO_3.	Ratios. 100 SO_3 : P_2O_5.
May 29	1510	18	50.7	15.29	121	3.67	91.8	2.77	24	18.1	132.5
" 30	1210	19	58.8	14.23	110	2.66	122.4	2.95	18.7	20.7	90.2
Average	**1360**	....	....	**14.76**	....	**3.16**	....	**2.86**	**21.3**	**19.4**	**111.3**
Aug. 12	1020	23	55.8	11.39	152.5	3.11	....	....	27.3	....	....
" 13	1410	16	44.4	12.52	90	2.54	....	....	20.3	....	....
" 14	640	24	71	9.10	225	2.88	....	....	31.6	....	....
Average	**1030**	....	....	**11.00**	....	**2.84**	....	....	**25.8**	....	....
Oct. 27	1775	23	46	16.55	107	3.81	....	....	23	....	....
" 30	1980		41.6	16.46	96	3.82	....	....	23.2	....	....
" 31	1380	22.5	53	14.61	111	3.34	....	....	23.4	....	....
Nov. 1	2090		39	16.27	90	3.76	....	....	23.1	....	....
" 2	1240	27	64	16.00	160	3.97	....	....	24.8	....	....
" 3	1180	27	67	15.79	155	3.66	....	....	23.2	....	....
" 4	1690	20	48	16.33	125	4.22	....	....	25.9	....	....
Average	**1620**	....	....	**16.00**	....	**3.79**	....	....	**23.7**	....	....
1902.			No. 55. Name, W. H. S.								
April 27	1295	25	66	17.15	182.5	4.72	131.8	3.31	27.6	19.2	142.6
" 28	1265	26.5	68	17.18	187.5	4.74	130.8	3.31	27.6	19.2	143.2
Average	**1280**	....	....	**17.16**	....	**4.73**	....	**3.31**	**27.6**	**19.2**	**143**
			No. 56. Name, A. C.								
May 2	1030	23.5	64.8	13.35	192.5	3.96	129	2.66	29.6	19.9	148.8
" 3	1305	21	55.5	14.36	150	3.91	104	2.71	27.2	18.9	144.2
Average	**1170**	....	....	**13.85**	...	**3.94**	....	**2.69**	**28.4**	**19.4**	**146.5**
			No. 57. Name, F. S.								
May 2	1000	25	78	15.59	175	3.50	153	3.06	22.4	19.6	114.3
" 3	1025	26.5	71	14.61	160	3.28	137.7	2.82	22.4	19.3	116.6
Average	**1015**	....	....	**15.10**	....	**3.39**	....	**2.93**	**22.4**	**19.4**	**115.5**

No. 58. Name, B. B.

1902. 24 hours ending	Cc. in 24°.	Sp. gr. 1.0—	N_2.		P_2O_5.		SO_3.		Ratios.		
									100 N_2 :		100 SO_3:
			Mg. in cc.	Total grm.	Mg. in 50 cc.	Total grm.	Mg. in 50 cc.	Total grm.	P_2O_5.	SO_3.	P_2O_5.
July 29	2450	12	39	19.28	65	3.22	76.5	3.74	16.7	19.4	86
" 30	1390	17	51	14.24	100	2.78	104	2.80	19.5	20	99
" 31	2100	12	37	15.7	75	3.15	64.5	2.71	20.1	17.2	116
Average	**1980**	....	....	**16.41**	....	**3.05**	....	**3.08**	**18.6**	**18.7**	**99**

No. 59. Name, E. T.

May 14	1425	23.5	60.6	17.27	160	4.56	112.8	3.16	26.4	18.3	144.3
" 15	1235	24	69	17.04	179	4.42	135.9	3.36	25.9	19.7	131.5
Average	**1315**	...	....	**17.16**	....	**4.49**	....	**3.26**	**26.2**	**19**	**137**

No. 60. Name, F. C.

May 6	1065	25	63	13.42	154.5	3.29	135.5	2.89	24.5	21.5	114
" 7	1070	25	64.7	13.97	171	3.69	134.3	2.90	26.3	20.7	128
Average	**1070**	....	....	**13.69**	....	**3.49**	....	**2.89**	**25.8**	**21.1**	**121**

No. 61. Name, C. E. D.

May 6	850	28	74.6	12.68	204	3.47	154	2.62	27.3	20.7	132
" 7	1075	28	73.9	16.07	197.5	4.28	146	3.17	26.7	19.8	135
Average	**970**	....	....	**14.38**	....	**3.88**	....	**2.89**	**27**	**20.2**	**134**

No. 62. Name, J. A. S.

May 18	1610	16	42.5	13.70	107	3.46	81.6	2.63	25.2	19.2	131
" 19	1200	18	56.3	13.51	135	3.24	118.9	2.85	24	21.1	114
Average	**1405**	....	....	**13.60**	....	**3.35**	....	**2.74**	**24.6**	**20.1**	**123**
June 5	1000	21	63.7	12.74	150	3.00	....	....	23.5	....	....
" 6	1120	20	57	13.71	145	3.24	....	....	23.7	....	....
Average	**1060**	....	....	**13.22**	....	**3.12**	....	...	**23.6**	....	....

No. 63. Name, Miss J. P.

1902. 24 hours ending	Cc. in 24°.	Sp. gr. 1.0—	N_2.		P_2O_5.		SO_3.		Ratios.		
			Mg. in cc.	Total gm.	Mg. in 50 cc.	Total gm.	Mg. in 50 cc.	Total gm.	100 N_2 :		100 SO_3:
									P_2O_5.	SO_3.	P_2O_5.
Dec. 6	1300	15	41.4	10.77	73	1.91	77.9	2.03	17.7	18.8	94.3
" 8	875	25	58	10.16	100	1.75	121	2.12	17.2	20.9	82.3
" 9	890	18	54	9.54	115	2.05	93	1.65	22.6	17.1	122
" 10	850	16	48	8.21	56	0.96	....	....	11.7	....	....
Average	**979**	....	...	**9.67**	...	**1.67**	....	**1.93**	**17.3**	**18.9**	**100**

No. 64. Name, Miss M. H. R.

Sept. 29	1720	13	33	11.47	69	2.39	66	2.27	20.8	19.8	105
" 30	1685	.09	33	11.23	77	2.61	61	2.07	23.2	18.4	126
Average	**1700**	....	....	**11.35**	....	**2.50**	....	**2.17**	**22.03**	**19.1**	**115**

No. 65. Name, Miss L. P.

Oct. 19	1400	10	19.7	5.53	50	1.4	....	....	25.3	....	....
" 20	1625	12	30	9.87	72	2.34	....	....	23.7	....	....
Average	**1500**	....	....	**8.3**	....	**2.0**	....	....	**24.1**	....	....

No. 66. Name, M. L. R.

Aug. 24	1230	22	56	13.77	125	3.07	....	....	22.3	....	....
" 25	1190	24	60	14.29	122	2.81	....	....	19.6	....	....
Average	**1210**	....	....	**14.03**	....	**2.96**	....	....	**21**	....	....

No. 67. Name, R. D.

Aug. 20	1875	15.5	42.7	16.01	95.5	3.58	....	....	22.3	....	....
" 21	1200	23	73.7	17.71	187	4.48	....	....	25.3	....	....
Average	**1540**	....	....	**16.80**	....	**4.03**	....	....	**24**	....	...

It is believed that the above metabolism experiments constitute the most complete and extensive experiments on record in connection with the insane. What do they teach?

1. From a constructive, positive point of view it must be admitted that they teach very little that is tangible concerning mental diseases except for the strong suggestion which they contain that in general paralysis we have a disease which may be associated at one stage or another with some demonstrable metabolism disorder.

From among the other classes of the insane individual peculiarities or abnormalities of metabolism, i. e., pronounced variations from the standard values given in table 8 are also very numerous, but so far it has been found impossible to identify any one metabolism peculiarity with any particular form of mental disorder.

2. From a destructive, negative or critical point of view, it is believed that the data given prove the untrustworthiness of all those metabolism experiments, old and new, which report a "characteristic" "increase" or "diminution" of any of the urinary constituents included in this research (i. e., volume of urine, total nitrogen, urea, ammonia, uric acid, kreatinin, organic bases, total sulphates, ethereal sulphates, "neutral sulphur," phosphates, chlorides, organic or mineral acids, indican) as associated with any particular one of the ordinary mental disorders.

It is not claimed that such characteristic abnormal metabolism may not exist, but simply that the experiments recorded in the literature are insufficient to demonstrate the fact.

3. From a general physiological point of view it is believed that the data contained in tables 1-47 should have considerable value as furnishing exact figures for the composition of a large number of urines and as tending to throw light on the laws of the normal secretion of urine, but this aspect of the results it has been thought best not to discuss here (see, however, Vol. LX, page 720, *et seq.*).

On page 717 was discussed the necessity of "standard diets" in metabolism experiments of this kind. In the continuation of this work I expect to use the diet described in this paper and in addition another—a low nitrogen diet—which I have reason to believe will be even more adapted to bring out any metabolism characteristics that may occur in the patients examined.

Notes and Comment

ASSOCIATION OF SUPERINTENDENTS AND TRUSTEES OF INSTITUTIONS FOR THE INSANE IN PENNSYLVANIA.—A meeting of this Association was held September 22, 1904, at the Pennsylvania State Asylum for Chronic Insane at South Mountain. Twenty-eight persons were present, this being the largest number in attendance at any meeting since the organization of the Association. After an address of welcome by the president of the board of trustees, Henry M. Dechert, the buildings and grounds were inspected. Papers were read by Dr. Chase, of Frankford, and Dr. Murdoch, of Polk. The meeting was presided over by Dr. Hutchinson, of Dixmont, and the following were elected as officers for the coming year: President, Dr. John B. Chapin; vice-president, Dr. H. B. Meredith; and secretary, Dr. Morris S. Guth. The next meeting will be held in May at Polk.

ANNUAL MEETING OF FRENCH ALIENISTS.—The fourteenth annual meeting of *Alienistes et neurologistes de France et des pays de langue française* was held at Pau from the first to the seventh of August, 1904. The proceedings were opened by an address from the mayor of Pau, who was followed by Dr. Brissaud, the president of the congress, who made an address of thanks to the mayor and to others who had labored for the success of the congress. He then delivered the presidential address, which was a eulogy of Théophile de Bordeu, a scientist and physician who was one of the first to discover cerebral localization. As is customary at these meetings, there were three addresses made on topics of especial interest in neurology or psychiatry, and following the address there was a general discussion. At the present meeting Dr. Deny spoke of "Demences Vésaniques," Dr. Seno of "Localisations motrices dans la moelle," and Dr. Keraval of "Mesures à prendre contre les aliénés criminels." Dr. Deny's

address was followed by quite a long discussion, and apparently attracted more interest than did the others. The total number of papers read was somewhat less than at the preceding congress, but this is probably accounted for by the fact that there are many places of interest in and about Pau and more time was spent in entertainments and excursions than at preceding meetings. The next meeting will be held at Rennes, August 1, 1905, where the three subjects for discussion are Hypochondria, Ascending Neuritis, and Hydrotherapy in the Treatment of Mental Diseases.

MEDICO-PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND.—The sixty-third annual meeting of this Association was held July 21 and 22, 1904, at the rooms of the Association, Cavendish Square, London. The address of the president, Dr. R. Percy Smith, was upon Paranoia, and was followed by a paper by Dr. G. E. Shuttleworth entitled, The Educational Treatment of Young Epileptics, and a paper by Dr. C. Hubert Bond entitled, A Plea for the Closer Study of the Body-weight and its Relation to Mental Diseases. Other papers were: Further Histological Studies in the Localization of Cerebral Function, by A. W. Campbell; The Finer Anatomy of the Nervous System, with special reference to the Doctrine of Continuity as opposed to the Neurone Doctrine, by John Turner; The Psychology of Hallucinations, by W. H. B. Stoddart; Asylum Ideals and Improvements in the Care of the Insane, by G. M. Robertson; The Question of how to Provide Accommodation in regard to Chronic and Incurable Cases of Mental Disorder, by J. M. Rhodes; and The occurring Pauper Lunacy of Glasgow Lunacy District and the Provision for its Care and Treatment, by J. Carswell. The annual dinner was held on the evening of the twenty-first at the Hotel Metropole, and a garden party was tendered the members of the Association by Dr. and Mrs. R. Percy Smith at the Botanical Gardens on the afternoon of the twenty-second. Judging from the titles of the papers, the meeting must have been an interesting one, and many of us will look forward with interest to the publication of the proceedings.

SECTION OF PSYCHOLOGICAL MEDICINE OF THE BRITISH MEDICAL ASSOCIATION.—The seventy-second annual meeting of the

British Medical Association was held at Oxford from the twenty-sixth to the twenty-ninth of July, 1904. The first session of the Section of Psychological Medicine was held on the twenty-seventh and was opened with the presidential address by Dr. Charles A. Mercier on Criminal Responsibility and Degeneracy, which was followed by considerable discussion. A lantern demonstration by Mr. David Orr and Dr. R. G. Rows on the degenerative lesions of the posterior columns of the spinal cord in paresis closed this day's proceedings. The next day Dr. J. Beard, of Edinburgh, read a paper entitled, Heredity as Viewed from the Biological Aspect, and was followed by Dr. König, of the Dalldorf Asylum, Berlin, on Heredity from the Psychiatrical Aspect. The remainder of this session was occupied with a discussion upon these two papers. The last day's session was principally given over to a discussion which was opened by Dr. Conolly Norman on Dementia Præcox, or the Premature Dementia of Pubescents and Adolescents, but papers were read by Dr. E. S. Pasmore, on How to Take a Family History, and by Dr. A. T. Schofield, on The Cure of Quackery. The annual dinner of the Association was held in the Hall of Christ Church on Thursday evening, the twenty-eighth, and was attended by about three hundred persons. An unusually large number of excursions and entertainments were arranged for.

Appointment of Dr. Adolf Meyer.—The many friends of Dr. Adolf Meyer will be glad to learn of his appointment to the professorship of Psychiatry in Cornell University Medical College, made vacant by the resignation of Dr. Allen McLane Hamilton. Dr. Meyer's work at Kankakee, Worcester, and at present as director of the Pathological Laboratory of the New York State Hospitals for Insane, has made him so well known that it is unnecessary to more than mention him, as everyone is well aware that he is well qualified for this position. The Journal extends its congratulations to Dr. Meyer.

Death of Dr. Karl Weigert.—It is with great regret that we learn of the death of Dr. Karl Weigert from apoplexy on August 5, 1904. Psychiatrists and neurologists owe a great debt to him for his perfection of methods of staining the central nervous

tissue which have so greatly facilitated the study of the pathology of mental and nervous diseases. Medical science in general owes much to his researches in bacteriology and pathological anatomy, which have laid the foundation for a considerable part of later research on these subjects. Dr. Weigert was fifty-nine years of age, and since 1884 had been Professor of Pathologic Anatomy and Director of the Pathologic Institute at Frankfort a. M. It is to be regretted that Weigert should have died without a commensurate recognition of his services to science from the German authorities.

ELECTION OF DR. C. K. CLARKE.—In accordance with the action of the Council of the American Medico-Psychological Association in St. Louis, in June last, Dr. C. K. Clarke, of Kingston, has been elected an additional editor of the American Journal of Insanity. We are gratified to announce that Dr. Clarke has accepted the position and will immediately enter upon the discharge of its duties.

MINUTE ADOPTED AT A MEETING HELD IN MEMORY OF DR. E. C. RUNGE AT ST. LOUIS, JUNE 2, 1904.—This assemblage, composed of professional and other associates of the late Dr. E. C. Runge, of those who witnessed his efforts in behalf of the afflicted, and their results, and of citizens brought together by respect for his memory and sympathy in the causes to which he devoted his life and energies, desires to give expression to some of the thoughts suggested by the occasion.

We recognize in the personality of the late Dr. Runge a rare combination of qualities; a brilliant mind, trained in many widely divergent branches of learning; the ability to make others the sharers of his mental treasures; a capacity for the strongest human attachments; the power and purpose for laborious effort and successful accomplishment sustained by a hope and enthusiasm whose genuineness made it infectious, and as the especial keynote of his character, an unswerving devotion to the true and right, which knew neither compromise nor retreat.

In the testimony given this evening by his colleagues in his chosen profession we have heard of the eminence to which he attained by his talents and his arduous endeavors; of the depths and

breadth of his scientific attainments; of the contributions with which he enriched the literature of medicine; and of the rare degree of success which attended his work among the insane.

We find in his management of the St. Louis Insane Asylum a record of administrative ability seldom equaled, and the exercise of gifts in the care and treatment of his wards and charges, rarely so fruitful in consequent good, and of which this community, claiming them as its own, may be justly proud.

We invite the attention of the people of this city and commonwealth to the obvious lesson to be derived from a survey of the aims and results of this one life; namely, that a devotion to the loftiest and purest ideals is not necessarily impractical, and further that it is our high duty individually to strive for the ultimate removal of those obstacles which interfered with the full fruition of Dr. Runge's hopes for the betterment of conditions in municipal administration, and which will remain as a bar to civic progress.

BENJ. CHARLES,
SIDNEY I. SCHWAB,
JOSEPH GRINDOW,
Committee on Resolutions.

PROCEEDINGS OF THE ASSOCIATION OF ASSISTANT PHYSICIANS OF THE OHIO STATE HOSPITALS.—The fourth session of the Association of Assistant Physicians of the Ohio State Hospitals was held at the Columbus State Hospital, Columbus, Ohio, October 5 and 6, 1904.

Afternoon Meeting, October 5.—Dr. George Stockton, superintendent of the Columbus State Hospital, made a short address of welcome.

William W. Richardson, of Columbus, presented a patient in whose case a diagnosis of syringomyelia had been made, and gave full clinical details.

Isabel A. Bradley, Columbus, presented three brain tumors. Two were sarcomata involving the left frontal lobes. The third was a large glioma occupying both lateral ventricles and involving the corpus callosum, fornix, and septum lucidum.

E. E. Gaver, Columbus, gave a brief report of eight cases of tuberculosis treated in the open-air colony at the Columbus State Hospital.

Guy H. Williams, Columbus, showed the pathological specimens from a case of sudden death, found at autopsy to be due to an aneurism of the heart.

G. T. Harding, Jr., Columbus, exhibited a patient, 9 years old, with slight hereditary predisposition, showing psychical attacks varying from short periods of depression to spells of subconsciousness of several hours' duration, in which the child acts very differently from her normal self. The attacks are preceded and accompanied by a slight rise of temperature, excessive action of the heart, and a feeling of sickness over the sternum. A tentative diagnosis of psychical epilepsy was made.

Ralph W. Holmes, Gallipolis, read a paper entitled, "Clinical Observations of Status Epilepticus." This paper was discussed by E. E. Gaver, F. D. Ferneau, G. T. Harding, Jr., I. A. Bradley, and R. W. Holmes.

Guy H. Williams, Columbus, read a paper entitled, "Arteriosclerosis of the Brain, with Report of Case with Autopsy." N. H. Young, G. T. Harding, Jr., E. E. Gaver, W. H. Pritchard, I. A. Bradley, and G. H. Williams discussed the paper.

Morning Meeting, October 6.—Mary E. Cadwallader, Dayton, read a paper entitled, "A Report of Two Cases of Insanity of Pregnancy and Puerperium." The discussion was by F. D. Ferneau, G. T. Harding, Jr., and M. E. Cadwallader.

Paper: "Laboratory Aids in the Rapid Diagnosis of Hydrophobia," by Walter H. Buhlig, Gallipolis, was read. Discussion by I. A. Bradley, K. S. West, F. D. Ferneau, R. W. Holmes, and W. H. Pritchard.

Following the completion of the program the business of the Association was taken up. Isabel A. Bradley, Columbus, reported the work of the dietary committee. This committee was enlarged to include one member from each state hospital. E. E. Gaver, Columbus, reported the work of the legislative committee. Ralph W. Holmes, Gallipolis, chairman of the special committee to represent the Association at the Cleveland meeting of the Ohio State Medical Association, reported the passage by that body of the following resolution: "Resolved, That the Ohio State Medical Association hereby expresses its approval and endorsement of the object and work of the Association of Assistant Physicians of Ohio State Hospitals."

W. C. Kendig and J. W. Mann, of Longview Hospital, Cincinnati, and E. B. Morrison and Arthur G. Helmick, Gallipolis, were elected to active membership.

The next session will be held at the Dayton State Hospital, Dayton, Ohio, April 5 and 6, 1905.

RALPH W. HOLMES, Secretary.

RETIREMENT OF DR. A. E. MACDONALD.—The retirement of Dr. A. E. Macdonald, on account of ill-health, from the superintendency of the Manhattan State Hospital, East, upon October 1, 1904, after a period of service of upwards of thirty years, is sincerely regretted by all who know him. It is the earnest wish of his many friends that a prolonged period of relief from official cares and responsibilities will be followed by his complete restoration to health. He has labored earnestly and faithfully among the insane of the City of New York and has earned the right to rest.

Dr. Macdonald has removed from the Manhattan State Hospital, East, to Columbia Court, 431 Riverside Avenue, New York.

Book Reviews

Lectures on Diseases of the Nervous System. Second Series. Subjective Sensations of Sight and Sound, Abiotrophy, and Other Lectures. By Sir William Gowers, M. D. (Philadelphia: P. Blakiston's Son & Co., 1904.)

There are ten lectures included in this collection and the above title includes the titles of three of them. The titles of the others are: Myopathy and a Distal Form; Metallic Poisoning; Syphilitic Diseases of the Nervous System; Inevitable Failure; Syringal Hæmorrhage into the Spinal Cord; Myasthenia and Ophthalmoplegia; and The Use of Drugs.

The first of these lectures deals with the subjective sensations of light which have been noted as occurring in migraine and epilepsy, and which Dr. Gowers believes are due to lesion of the cerebral center. In the second lecture the author discusses subjective sound association, here also laying especial stress upon the part played by the cerebral cortex. He holds that the character of labyrinthine sounds is to a large extent influenced by the cerebral center, and leaves the consideration of this subject with great regret.

The third lecture is of especial interest as the author discusses the condition to which he has applied the new term "abiotrophy." This he defines as diminished vital nutrition, and gives as examples of the condition the falling out of the hair in the middle life, muscular dystrophy, and the neural conditions known as scleroses. The fourth lecture on Myopathy illustrates a special form of abiotrophy. In the treatment of this form Dr. Gowers considers muscular exercise as the one agent capable of causing an arrest of the degenerative process.

Under Metallic Poisoning are discussed the effects of lead and arsenic.

In the lecture upon Syphilitic Diseases of the Nervous System the author presents "some general principles concerning the most important practical branches of the subject," which shall serve especially to guide in the prognosis and treatment. The former can only be made by discovering whether the causal element can be removed, and to what degree the neural elements can recover. In the treatment he suggests no new remedy but discusses in considerable detail the best methods of using mercury and the iodide. The seventh lecture on Inevitable Failure is a study of syphilitic arterial disease and begins with a description of a most interesting case which is followed by a thorough discussion.

The last three lectures like all of the others are extremely interesting and it hardly seems necessary to state that this book will well repay a perusal

by all who are interested in neurology. To those who are familiar with this writer's first collection, it is needless to speak of the charm which Dr. Gowers gives to all of his writings. His happy faculty of describing unusual symptoms which most of us are too apt to dismiss as interesting, or inexplicable has given us two very interesting papers in this volume.

W. R. D.

Ueber die Frage des Heiratens von früher Geisteskranken. Von HEINRICH SCHULE. (Leipzig: S. Hirzel, 1904.)

This is a reprint of a paper read at Göttingen, in April of the present year, before the Jahresversammlung der deutschen Psychiater. It consists of twenty-six pages and the author explains that he has treated of the same subject in an address delivered in 1888, before the same society. He reviews the opinions of those who have commented on the earlier paper, and then proceeds to discuss the question of the marriage of those who have been insane, at some length. He does not reach a positive conclusion but makes a plea for further investigation upon this question, and in order that uniform results may be acquired gives a classification of mental diseases and a form of questions to be adopted. The paper is a most interesting one.

W. R. D.

Publications of Cornell University Medical College. Studies from the Department of Neurology, Vol. 1, 1904, New York City.

This volume consists of clinical and pathological studies completed in the Department of Neurology during 1904, and here published for the first time, and of reprints of papers which have previously appeared in various medical journals. In the first group are seven papers by Drs. Charles L. Dana and J. Ramsay Hunt, and in the second twelve papers by the above and Drs. Joseph Fraenkel and T. W. Hastings. Lack of space forbids detailed mention of these papers which it is hardly necessary to state are all of considerable merit. Each paper is preceded by an abstract in Latin by Dr. A. Avellanus, which will doubtless be of value to foreigners. Like a number of other publications of this kind the pages are not of uniform size, the type is of many varieties and there is an absence of consecutive paging. These irregularities detract from the appearance of the book but doubtless materially decrease the expense of its publication. It is certainly convenient to have the papers of this group of workers gathered together into one volume.

W. R. D.

Ueber den Moralischen Schwachsinn des Weibes, von Katinka von Rosen. 2 auflage, Halle, 1904, Carl Marhold.

This pamphlet is an endorsement of the misogynistic ideas of Moebius and an attempt to go him one better by proving that women are naturally deficient in moral sense. In a foreword to the present edition Prof. Moebius declares that "moral imbecility" is included in the term "physi-

ologische schwachsinn" and that a correct title for this work is Ueber den physiologischen Schwachsinn des Weibes in Moralischen Hinsicht. The work proper covers thirty pages but the pamphlet is expanded to forty-eight by means of three forewords, and letters and press notices. It is rather entertaining.

W. R. D.

Dementia Præcox: The Psychoses of Youth, I. By HANS EVENSEN. (Christiania, 1904.)

This excellent monograph is written in Norwegian, and it seems to the reviewer that its existence and main features ought to be made known to American alienists, to a majority of whom every new contribution concerning dementia præcox is certain to be of interest. Every phase of the subject is thoroughly treated, and all statistics and conclusions are based on the author's personal study of 300 cases, observed during his service at the Gaustad asylum near Christiania. The onset of these cases was between the ages of 14 and 26. Cases coming on later have not been included, as the author is dealing only with the psychoses of youth. In the preface he announces his intention to treat the subject of manic-depressive insanity in a similar way in a future volume. In the main the author shares Kraepelin's views, and, like him, emphasizes the importance of clinical methods, not at present finding much aid from pathologic histology, chemistry and experimental psychology. His conceptions of hebephrenia and katatonia as sub-classes are like those of Kraepelin. He does not devote any chapter to the paranoiic form, as he has had no difficulty in placing all his juvenile cases under two other forms. He also intimates that Kraepelin has transferred too much of the true paranoia to his paranoiic form of dementia præcox. Only a few complete case histories are given, but the admirable and thorough discussion of special symptoms is freely illustrated by the author's observations. Thirty good text-illustrations are given. Useful tabulations are made of the occurrence of various symptoms, etiologic factors, etc., in his own cases, thus giving us a positive, though, as the author himself states, a modest addition to our sum of carefully observed facts concerning this disease. The chapter on peculiarities in speech and writing is very thorough and profusely illustrated. The author deplores the lack of attention that has been given to somatic symptoms by others and gives detailed consideration of them. After the discussion of the various symptoms, hebephrenia and katatonia are given separate chapters. Then comes a very clear historical review, in which, as may be expected, much credit is given to Kahlbaum, the father of katatonia, especially for his emphasis of the study of the evolution and order of appearance of both psychic and somatic symptoms, and for subordinating symptomatic forms under a higher unit, while the author disagrees with Kahlbaum in the latter's optimism as to prognosis. Kraepelin is naturally credited with having gained recognition for Kahlbaum's views and for further enlarging them, giving Kahlbaum's katatonia its place as a group of dementia præcox. In considering

the present status of the dementia præcox question in various countries it is stated that in England etiologic classification is the favorite, while American literature gives more evidence of influence from Germany. Mention is made of Kiernan's paper on katatonia before the New York Neurological Society in 1877. While aware that katatonia is not even mentioned in Berkley's text-book, and not considered a clinical entity by Langdon and Peterson, the author beiieves that Kraepelin's views are now gaining ground in America, the papers of Sprague and Hill (1900), Dercum (1901), and Dunton (1902) being cited in evidence. Very interesting is a chapter entitled "Psychologic Considerations." Here an attempt is made to analyze the katatonic symptoms—stupor, suggestibility, stereotopy and negativism—and establish their analogy with the phenomena sometimes observed in normal people whose minds are entirely occupied by one thought. Such people will sit immobile, oblivious to what is going on about them (Archimedes), and of their organic wants, such as hunger, thirst, desire to urinate, defecate, etc. In a moment of less preoccupation these desires may suddenly make themselves known with irresistible force. Peculiar attitudes and automatic movements are frequent, and a thoughtless "don't know" or "yes" in reaction to questions the meaning of which is not appreciated, the answer often depending on the intonation or form of the question. Many such similarities are brought forward and the suggestion is offered that the essential in both the preoccupied and katatonic person is the "narrowing of consciousness around a central content." The analogies between the katalepsy and echolalia induced by hypnotism and katatonic stupor are also considered in favor of the explanation offered. The last two chapters deal with etiology and differential diagnosis in a lucid manner. The work is so promising that we feel tempted to suggest to the author to have this volume translated and have the succeeding volumes appear in English or German so as to make them accessible to the world at large.

Adolescence: Its Psychology and Its Relation to Physiology, Anthropology, Sociology, Sex, Crime, Religion and Education. G. STANLEY HALL, Ph. D., LL. D., President of Clark University and Professor of Psychology and Pedagogy. (New York: D. Appleton and Company, 1904.)

I have been asked, in reviewing this work, to consider it in its broad philosophical aspect rather than from the standpoint of the neurologist or the student in any particular field; but, on account of the space which the author has given to statistics and his conclusions therefrom, it will be necessary, in order to give a true impression of the value of the book, to devote some attention to that element in its composition.

The book is avowedly based upon the author's as yet unpublished Psychology, the standpoint of which is provisionally indicated in some of the chapters of the present work. Several points upon which modern psychologists are already well agreed are insisted upon at the outset: such as the insufficiency of introspection, and the importance of observation,

description, and induction; the value of animal, savage, and child psychology, as well as of the study of the abnormalities of the criminal and the insane; the applicability of the concept of evolution or development, and the connection between ontogeny and phylogeny—the development of the individual and the development of the race.

The first four chapters are devoted to the general physiology of adolescence—growth in height and weight and of the various parts and organs of body and mind characteristic of that period. "Juvenile faults, immoralities, and crimes" form the subject of the fifth chapter.

The psychic traits of adolescence include increased liveliness of imagination, and willingness to attempt almost impossible feats; inner absorption and reverie; self-criticism, inclined sometimes to become morbid; over-assertion of individuality, and the cultivation of eccentricities; fondness for imitating, and dramatic activity; foolishness and silliness, as shown in many college songs and customs; change and enlargement of vocabulary; and general widening of social life, sometimes, however, counterbalanced by extreme bashfulness. About fifty pages in all are devoted to the mental and nervous disorders of adolescence, but there is little in those pages which seems to call for further notice here.

President Hall affirms his standpoint with regard to the human soul to be that of "a new and higher monism and an evolutionism more evolved." He protests against the excessive concern as to the future state of the soul, the slight interest taken by religion in the question of its origin and the "not only unscientific but almost abnormal aversion to consider its past." This may be due in large measure to the fact that the philosophical mind aims to classify everything according to a formulated scheme, and so is unable to grasp the significance of genetic psychology. Hence the disposition to neglect criminal, child, race, and abnormal psychology—all of which are in reality very important auxiliaries to the study of the normal adult human soul. Furthermore, mind and body are interconnected, and each can be known only in its relation to the other. Hence biology and psychology are inseparable sciences. The soul is, like the body, an organized unity, and reflects the growth of every part and organ of the latter. They have the same problems with regard to the influence of heredity and environment on their development. Moreover, the soul is sexed, and, as in the case of the body, individuation and sex-differentiation are augmented at adolescence. The soul in the lower animal species is indistinguishable from life, and mind is probably coextensive with life, or at least with animal life. Here the will to live is the elementary mind-substance, and food-getting is the first function of the soul.

"The salvation-motive is unscientific." The student must drop soteriological influences, and recognize that the human soul is like the body, a product of heredity, and still imperfect. Such is the conclusion to which we are driven by a strict adherence to scientific and evolutionary methods.

In a chapter on Intellectual Development and Education, in the midst of his treatment of the condition of college and university education, the

author interpolates his own views on the fundamental metaphysical problems. He protests against the "aberrations of epistemology and metaphysics," and pleads for purely empirical methods in the discussion of philosophical questions; but, notwithstanding this emphatic declaration, we have in the table of categories which he has drawn up—the fundamental character of which he insists upon—a formulation of principles that are neither empirical in their origin nor rational in their development. These "necessary postulates" are asserted categorically to be six in number; namely, Space, Ether, Force, Law, Fulness of Life, and Good-will seen in the Survival of the Best. In the first place, (1) Euclidean Space is declared to be absolutely universal and infinite; it cannot be transcended or thought away; it is immediate and presuppositionless; it is at once the principle of reality and the principle of negation, pure being and pure nothingness. (2) The category of Ether is identical with that of being, for all particular being is defined through the relation of ether to space: this ether is structureless, homogeneous, continuous, non-material; it is the source and destiny of all things, and all physical and vital energy is resolvable into it; it is known only to mind, and not at all to sense; finally, it fits every valid definition of substance or ultimate reality, and satisfies the ontological argument for the being of God. (3) The world of the senses is essentially dynamic—there is no dead or inert matter; all forms of existence follow the principle of conservation of energy, that the greatest quantity of Force possible in the world exists now, either latent or potent, and this force man must interpret always in terms of will. (4) Experience, and reflection on nature and society, bring Law into the world: There can be no chaos or chance, and all sequence involves a cause. But (5) this mechanical view must ultimately be subordinated to Life, which is ever evolving higher and higher orders of existence; and thought demands the maximum quantity of life possible in the world. Finally, (6) the doctrine of evolution, which affirms that the best always survives and that development is upward and creative, arouses the spirit of Optimism: pain tends toward extinction, but the abundance of life is increased by the pleasure which it contains, whereas growth and culture are marked by a steadily widening field of pleasure. These principles being set forth thus dogmatically, the author can hardly hope to arouse immediate conviction in the minds of his readers; but the latter are on their part in no position to criticise those principles until they have received fuller elucidation and discussion in the general work which Professor Hall has promised us.

As puberty is primarily that period in the development of the individual in which the organs that distinguish sex are brought to their highest point of differentiation, a large part of the book is devoted to the general problem of sex. Next to this, perhaps, comes the consideration of religion in its relation to adolescence, and the connection between religious devotion and sex love is strongly insisted upon. There is a natural synchronism between sexual and religious awakening, the ordinary age of conversion being the same as that in which the sexual organs attain their highest

development, and a new interest in religious matters being synchronous with a newly aroused interest in matters relating to sex. True and deep religious or sexual experience is almost impossible before adolescence. Nor is any degradation of religion involved in this acknowledgment of its relationship with sex. Religious and sexual love rise and degenerate together; for the latter is the religion of the flesh, as religion is the love of the spirit. Both suggest death and triumph over it, for both the lover and the religious enthusiast profess themselves willing to die for their ideal, and yet remain conscious that spiritual and fleshly love are alike stronger than death. Christianity has done much to refine the commonly gross conceptions of sexual love, for by it the love of God is elevated above all other loves, and yet sex love is recognized as symbolic of the love between God and man, as where St. Paul makes the union of the sexes in marriage the type of the union between Christ and His Church in the Sacraments. Love is the greatest thing in the world both for religion and for sex; it is, moreover, essentially creative in every sphere, for it sensitizes the soul to nature, and is a source of inspiration in art, science, and literature.

The superlative importance of the sex element in human life is fully appreciated by President Hall. All the organs and functions of the adult, even the average term of life, are regulated to meet the necessities of reproduction and education. A chapter is devoted to sexual development in general, and its dangers and hygiene in boys; and another is concerned with periodicity as the chief sexual function in the adolescent woman, the author pleading for a recognition of this function as one of which woman should be proud, rather than ashamed as has so often been the case.

Adolescence is the period in which for the first time there arises the consciousness of sex as a prominent factor in life. It is a new birth of both soul and body, marked by an awakening of latent faculties and a broadening of mental vision. A new and fuller meaning is given to life, and the budding man or woman is brought to realize his or her function as a servant of the race and a necessary instrument for its preservation and development. This novel condition in the life of the individual cannot be expected to come and pass without leaving its trace—be it light or heavy—upon character, and President Hall most properly devotes considerable attention and necessarily plain talk to these matters. He fully recognizes the importance of guarding youth against the prude on the one hand and the quack on the other, and insists on the necessity of careful but plain instruction to those who are passing through this vital period in their lives as to its normal significance as well as to the dangers and temptations which are likely to obstruct its path. The ignorance in which the well-meaning parent so often leaves his child, and the error with which those to whom he may turn in his vague yearning for knowledge so often poison his mind, are alike ominous for his future. At adolescence, sexuality evolves as a new function, which arises as a blind instinct, and to this, rather than to deliberate knowledge and purpose, the sexual crimes

of youth are generally due. The truly "momentous inference" which President Hall draws from his investigations in the field of sexual immorality is "that there is almost no feature, article of dress, attitude, act, or even animal or perhaps object in nature, that may not have to some morbid soul specialized erogenic and erethic power."

The chapter entitled "Adolescent Love" is really concerned with the general problem of the relation between the sexes, and is in many respects the most interesting to the philosophical student and the general reader. It is a finely written panegyric on sexual love in its purest—that is to say, its normal—form. Love is the religion of the flesh, and it is natural that the sex principle in nature and in human life should, at some period or periods in the course of history, have been regarded as an object of religious adoration. Nor is this "phallic worship," as it has come to be called, essentially associated with evil practices, though as a matter of fact its history is almost unprintable. At best, it must remain only an imperfect stage in the development of religion, and must lead in the natural course of events to something higher. This higher development appears in the veneration of motherhood which has been such a noted feature of the Catholic religion, whose devotion to the Blessed Mother of our Lord as the type of all mothers has been so falsely termed "Mariolatry" among those who acquire all their knowlege of church doctrine either second-hand, from the avowed enemies of the church, or else from the practices of ignorant individuals within its borders.

The periods in the ontogenetic development of the true sentiment of love are traced in an interesting manner from the early asexual "love" of the child, through the vague instinctive sex-sense of the adolescent. This true love can arise only in maturity and when it comes it invariably imparts, to him or her who has not already tasted of forbidden fruits, a tremendous stimulus to mental, moral, and spiritual growth. Sex consciousness must be early recognized and cultivated, else it will be perverted; strict chastity of mind and body should be rigorously maintained until maturity. If normal conditions are so preserved, spiritual and physical union will coincide. This the author well calls the polarization of life, which opens up an entirely new life to the soul, and fills it with hitherto unknown rapture. Early unchastity is found to destroy what is best in this normal experience. The end for which sex is developed is the formation of a new personality, but reproduction must always partake of the nature of a sacrifice, for the individual must soon begin to decay after reproductive power is lost, and nature transfers her protection to the offspring—or rather the species as a whole. Moreover, interest in the offspring is now superimposed upon the love between the parents, and without this new interest love is incomplete.

It will be impossible to review at length President Hall's conclusions on the relation of adolescence to religion, education, and sociology, beyond what little has already been said on these portions of his book. One chapter is devoted to religious ceremonies, including savage public initiations, the

institutions of classical antiquity, the ceremonies of medieval knighthood, and Jewish and Christian rites of initiation into full membership in the Church. Adolescence has been recognized by all religions as a formative period in the life of the individual. It is the age of religious as well as sexual awakening and conversion, in all its many forms; of that inner change of heart of which the various rites of confirmation are or should be the outward expression. The Psychology of Conversion, then, becomes the subject of another chapter. In this chapter President Hall takes occasion to criticise in a footnote one of the most eminent recent treatments of that subject—the Gifford Lectures of William James, of which he says that "many if not most of these 'experiences' are the yellow literature of religious psychology," and so incapable of properly explaining normal religious life and development.

The Bible President Hall calls "man's great text-book in psychology," not a text-book in theology. Conversion he conceives as an "at-one-ment" between man and God after an apparent estrangement or "heterisation," a reinstallation of the individual or race into its true place in the world; and he protests against current tendencies to regard it as an instantaneous process, to intensify its causes and effects, to conceive a conventional type to which all particular cases should conform, and to remove it from its proper place in the period of adolescence.

Religion in general is defined with etymological literalness, as rebinding, bringing back, or restoration. "As natural, it is re-established unity with nature; as ethical, a reunion of conduct with conscience; as theoretical, it is a re-at-one-ment of the mind with truth; as feeling, it is the ecstatic closing in again of the highest love with its supreme object, or fresh impulse along a forsaken but recovered path." How far President Hall thinks religion has in its practice sunk below its ideal may be seen from the following quotation, the justice of whose implications, however, I am unable to accept: "In the name of youth I postulate and await without a shadow of doubt or fear (1) broader conceptions of the human soul, which in this field lives far more by feeling and instinct than by reason, that faith, the greatest of all its faculties, be rescued from present neglect and degeneration; (2) loftier ideas of scripture that shall make it not a fetish but the true and living logos of the human heart and will, never finished and complete in the past, but a never-ending progressive revelation of which the prophets and Jesus gave us only the beginning; and (3) eternal warfare upon orthodoxies and all dogmatic finalities, which are only the petrifactions of faith, ultimately connected in ways psychology is only just beginning to see with the devitalization of life and mind caused by past or present sinful excesses."

Education in general is given a chapter; and the question of the higher education of women, including the coeducation of the sexes, with its influence upon marriage and fecundity, is treated in another. Sociology, we may say, is given two chapters. Another chapter treats of adolescence in Literature and Biography, taking its instances from Greece (especially

the Platonic dialogues, whose studies of youth President Hall particularly admires), Christian history (our Lord's disciples, the early and medieval saints, and the men of the age of chivalry), and recent biography.

It is time now to close up our account and to arrive at a general estimate of the value and place of this work in the field of investigation with which it is concerned. And at once it should be said that this is not only the first considerable publication of its eminent author, but is the first and at present the only comprehensive study of the period of which it treats. It is the result of years of investigation and painstaking collection of material from every possible source that may have the slightest bearing on the subject. One of its indices contains some two thousand names of those whose work is quoted in the body of the book. It will thus ever remain a monument to its author's indefatigability, and a center from which all future work in this field must radiate, and to which investigators must continually turn for reference and for inspiration.

The constant use of long, rare, and often, perhaps, newly coined words throughout the book strikes the reader as out of place and in a way stilted, and must inevitably be a defect in a work of this nature. Adverse criticism of the method on which a book is founded, however, must be deeper than any mere protest against the form in which it is presented to the world; and the statistical method on which President Hall bases all his conclusions in every part of his chosen field is always open to question, at least as to the infallibility with which writers of his type of thought seems to endow it. The best we can say for statistics is that they are interesting, and that they are useful in the approximation of results, but we are not justified in relying on them for anything more than that.

A conspicuous factor in President Hall's treatment of his subject is the sympathy for youth which he shows throughout. The student of adolescence, he says in his preface, must love and feel for the young. This principle is true in every field—that there can be no understanding without sympathy—and surely it is nowhere more true than in the field of anthropology, in which we have to deal, not with abstractions, or with things of wood and stone, but with living, breathing, and feeling human beings. And of this the intending reader of President Hall's book may be confident, that no man is better able to love, feel for, and therefore understand, childhood and youth at its best, than the author of this excellent and valuable work.

Books Received

Surgical Anatomy of the Head and Neck. By John B. Deaver, M. D. Illustrated by 177 plates nearly all drawn from original dissections. 1904. 4to. 770 pages. P. Blakiston's Son and Co., Philadelphia.

The surgical Treatment of Bright's Disease. By George M. Edebohls, A. M., M. D., LL. D. 1904. 8vo. 327 pages. Frank F. Lisiecki, New York.

Beauty through Hygiene. By Emma E. Walker, M. D. Illustrated. 1904. 16mo. 306 pages. A. S. Barnes and Company, New York.

Pamphlets Received

Prolonging the Productive Period. Henry A. Haigh, Teachers' Sanitary Bulletin, No. 8.

The Restriction of Diphtheria. Guy L. Kiefer, M. D., Teachers' Sanitary Bulletin, No. 6.

Twenty-Second Annual Report of the State Hospital for the Insane at Warren, Pennsylvania. Year ending November 30, 1903.

Sixty-fifth Annual Report of Columbus State Hospital. Year ending November 15, 1903.

Health of Body and Soundness of Mind. T. S. Clouston, M. D. Reprinted from "Life and Work."

A Plea for Justice to the Consumptive. S. A. Knopf, M. D. Reprinted from the Medical Record, January 2, 1904.

An Address on the Scottish Medical Corporations and the Public Weal; How they might Develop a Health Conscience. T. S. Clouston, M. D. Reprinted from the British Medical Journal, July 11, 1903.

The Prodromata of the Psychoses and their Meaning. T. S. Clouston, M. D. Reprinted from the Review of Neurology and Psychiatry, December, 1903.

Neurasthenia-Alcoholism-Insanity. William Lee Howard, M. D. Reprinted from The St. Paul Medical Journal, 1904.

Sexual Perversion in America. William Lee Howard, M. D. Reprinted from the American Journal of Dermatology and Genito-Urinary Diseases. Vol. VIII, No. 1, 1904.

Bulletin No. 91. Of the Maryland Agricultural Experiment Station. Experiments with Nitrogenous Fertilizers.

Bulletin No. 92. Notes on Apple Culture.

Bulletin No. 93. Second Report on the Pithiness of Celery.

Sixty-first Annual Report of the Utica State Hospital at Utica to the State Commission in Lunacy for the year ending September 30, 1903.

Report of the Trustees of Bellevue and Allied Hospitals for Three Months ending December 31, 1903.

Neurology in Philadelphia from 1874 to 1904, by Charles K. Mills, M. D. Reprinted from the Journal of Nervous and Mental Disease, June, 1904.

The Physiological Areas and Centers of the Cerebral Cortex of Man, with New Diagrammatic Schemes. Charles K. Mills, M. D. Reprinted from the University of Pennsylvania Medical Bulletin, May, 1904.

Un Caso Di Psicosi Uremica Con Sintomi Coreiformi. Nota clinica del Dottor Ferdinando Maggiotto.

Su La Dottrina Di Flechsig De Le Zone Percettive E Le Zone Associative. Del Prof. L. Bianchi.

Thirty-third Annual Report of the Medical Superintendent of the Middletown State Homeopathic Hospital at Middletown, N. Y., to the State Commission in Lunacy for the year ending September 30, 1903.

Contribution to the Study of the Growth of the Feeble-Minded in Height and Weight. A. R. T. Wylie, Ph. D.

Un caso di psocosi uremica con sintomi coreiformi. Del Dottor Ferdinando Maggiotto. Estratto dalla Riforma Medica, anno XX, num. 20.

Half-Yearly Summary

MARYLAND.—*Sheppard and Enoch Pratt Hospital, Towson, Md.*—There is being constructed at this hospital an extensive hydro-therapeutic plant. This will be situated in a portion of the basement of the women's building occupying nearly the entire south wing. There will be a pool 16½ x 15 feet which will have a depth of water varying from 3½ to 4 feet. This pool is to be lined with white tile and be surrounded by a nickel plated rail. There will be a room which will contain a control table, which will regulate the temperature of water used in the various other pieces of apparatus and the pressure of the douche. This room will also contain a shower and needle bath, an ordinary bath tub and a sitz bath. In an adjoining room there will be steam cabinets and a marble shampoo table. Both of these rooms will communicate directly with the dressing room. Adjoining these rooms will be a room devoted to massage and another room for electrical apparatus. In still another room there will be a large tub arranged for prolonged bathing according to the best method now in use. This tub will be so arranged that the water will come in through a pipe arranged around the bottom of the tub which will be supplied from a tank in which the temperature of the water can be easily regulated. There will also be a large lounging and resting room fitted up with couches and easy chairs. In addition to the rooms already described there will be rooms for towels, soiled clothing and the like. The corridor upon either side of which the rooms above described and the pool lie is of ample width, well lighted, will have a floor and base of venetian mosaic and is accessible from the women's wards by a flight of stairs and for the men from a door leading to the grounds.

During the summer the superintendent's residence on an elevation to the northwest of the hospital buildings has been completed and is now occupied by Dr. Brush and his family. The house, which is quite large and attractive, is built in the colonial style and is very comfortably arranged. It is so situated that it is within convenient distance of the hospital buildings and yet not so close as to form part of them. It is connected by telephone with the offices and wards of the hospital and with other parts of the hospital grounds.

An electric bus has been purchased by the trustees of the hospital for use in conveying visitors from the York Road entrance to the hospital buildings. Its use has been found a great convenience, the trip is made quicker than can be made by carriage and a large number of passengers can be carried.

Dr. Stewart Paton, director of the laboratory, went abroad in June, for extended study in France and Germany. He expects to be absent until the fall of 1905.

Dr. Clarence B. Farrar, one of the clinical assistants, who has been abroad since August, 1902, returned late in September, and will take up special study in physiological and experimental psychology as well as doing the laboratory work formerly conducted by Dr. Paton. The greater portion of his time was spent in Heidelberg in study under Kraepelin and Nissl.

MASSACHUSETTS.—*McLean Hospital, Waverley.*—Beginning October 1, 1904, there will be a change in the training school for women nurses.

The length of the course will be increased from two to two and a half years, more instruction will be given and the nurse will have more time for study. She will be given courses in anatomy, physiology, hygiene, bacteriology, urinalysis, hydrotherapy, electrotherapy, massage, physical exercise, the dispensing of drugs, housekeeping, cookery, general nursing, and the nursing of cases of nervous and mental disease. Instruction will be given by means of text-books, lectures and where practicable by demonstrations and actual work in the dispensary and the laboratories, as well as in the wards of the hospital.

During a half of the first school year the pupil will be given no more work on the wards than is necessary to put in practice the demonstrations received in the course of instruction,—perhaps 2 hours daily. For this time the hospital will be practically a boarding school for the pupil nurse.

The change will necessitate the employment of more nurses and will be an additional expense to the hospital, notwithstanding a reduction of $5 in the monthly pay.

The length of the course for men nurses will continue for the present to be two years.

MICHIGAN.—*Michigan Asylum for the Insane, Kalamazoo.*—A detached hospital building for the care of acute cases among men is being erected at this asylum. It will accommodate 76 patients and 20 nurses and is designed with special reference to the care of the presumably recoverable. All cases will be admitted to this building and those found to be chronic will be transferred to other detached buildings or to the general wards of the asylum. The building is so arranged that the acute case upon admission will see but little of others and will not come in contact with the distressing conditions inseparably connected with admission to a general ward. Beside the day rooms and sleeping accommodations for the patients there is a laboratory, diet kitchen and serving rooms, rooms for hydrotherapy, massage and electric treatments. Special provision is made for the continuous observation of the markedly depressed. Provision is made for the amusement and entertainment of the convalescent patients. A small operating room is provided in which surgical attention may be given to such

cases as require it. The plan for this building is a distinct improvement over that of the hospital for women erected a few years ago. The latter has proven to be so satisfactory not only to the physicians and nurses of the asylum but to the friends of patients that it is expected even better results will follow the opening of this new building for men. The present insanity law of Michigan wisely provides for the voluntary admission to these hospitals of persons nervous but not insane. Several cases have already taken advantage of this provision of law with thus far none but pleasant experiences.

On June 30, 1904, the close of the fiscal year, there were 1571 patients under treatment and on September 27, there were 1620. Owing to this rapid growth additions to the boiler-house and coal-shed became necessary and these are about completed with the installation of two new boilers each of 150 H. P. capacity. All buildings are heated from the central plant, steam being carried about 2,000 feet to the new hospital.

The thirteenth annual session of the Asylum Training School will open on October 10, under the able supervision of Miss R. Helen Cleland, Superintendent of Nurses, formerly of the McLean Hospital.

MISSOURI.—*The Punton Sanitarium, Kansas City.*—This sanitarium is making a large addition to the building. This is necessary owing to the increased demand for the accommodation of patients. At present there is accommodation for forty patients. The present building was constructed four years ago and it was then thought to be sufficiently large for any call which might be made, but during the past year the average daily population was four and a fraction higher than for the preceding year. The building is a fireproof brick structure, equipped with all modern conveniences and medical appliances. The addition will cost five thousand dollars.

NEW YORK.—*The Long Island Home, Amityville.*—The past half-year has been a very successful and satisfactory one to the management of the Home. The number of admissions has been rather above the ordinary, as has been the daily average population. A new wing with accommodations for nine patients, two new dining-rooms and a nurses' dormitory has been added to the women's department, thus relieving the congestion incident to the increased census. This new wing is so arranged that it can be conducted in connection with the hospital ward, and so that it is possible in a large measure, to isolate the noisy or disturbed patients from those that are quiet, but who because of suicidal tendencies or for medical reasons require to be kept in the hospital ward.

—*Binghamton State Hospital, Binghamton.*—During the past year there has been in process of construction a new building for the special care of insane patients suffering from tuberculosis. This building is located on a hillside facing the south with a dense forest immediately in the rear and to some extent on each side. It is therefore protected from cold northerly and westerly winds with the maximum sun exposure. This building

will be known as Edgewood and will accommodate 100 patients. It will be occupied this fall.

As part of the general plan for increased accommodations for patients a separate residence for the Superintendent and his family is now being erected. When this building is completed the apartments now occupied by the Superintendent will be converted to the use of patients. A new dining-room will be constructed and the hall formerly used as a chapel will be available as a dormitory. About 80 patients will thus be provided for.

A new hospital building for the care of patients suffering from acute attacks of insanity will be erected at this institution soon. The state architect has the plans nearly completed and it is expected that proposals for the construction will be requested this fall. This building will accommodate 30 patients of each sex.

The hospital is now crowded far beyond its capacity. The number of patients cared for is 1415, the greatest population in its history. To relieve this crowding and to provide additional accommodations plans are in course of preparation for a new building to accommodate about 450 patients. The site for this building is on a hillside facing the south where there will be commanding views up and down the valley of the Susquehanna river.

During the past year under the Good Roads law a splendid stone road has been constructed between the main hospital plant and its outlying farm colony, a distance of nearly two miles, and at the present time a contractor is at work building a similar road between the hospital and the paved streets of the city of Binghamton, a distance of more than two miles. When this road is completed, communication between the hospital and the business center of the city by wagon or carriage will be greatly improved.

—*The Society of the New York Hospital, Bloomingdale, White Plains.*—Recently a pamphlet was issued from the Psychopathic Department of the New York Hospital, at Bloomingdale, White Plains, N. Y., giving a historic and descriptive account of the Bloomingdale Asylum as it was founded and existed in New York, and of the new institution at White Plains. This is interesting from the fact that much of it is a compilation of work done by the venerated Dr. Pliny Earle, who was in charge of Bloomingdale from 1844 to 1849. The institution as it exists at White Plains is enjoying an unusual degree of prosperity, has always been free from debt, with a surplus for improvements. It is supplementing its hydrotherapeutic treatment with salt bathing in the Long Island Sound, at a beach within easy driving distance, where the institution has a pavilion; and is also giving boat rides upon the sound in a launch, to a number of patients who are sufficiently intelligent to appreciate and be benefited by this kind of outing. The number of patients has slowly but steadily increased, there being at the present time 165 men and 180 women, a total of 345. There have been no changes in the staff since the last item in the JOURNAL.

—*Buffalo State Hospital, Buffalo.*—A Conference of the physicians of the state hospitals located in Central and Western New York was held at

the Buffalo State Hospital, May 17, 1904. Dr. Adolf Meyer, Director of the Pathological Institute of the New York State Hospitals, Ward's Island, N. Y., had charge of the program. There was an attendance of about twenty-five physicians, and the Rochester, Utica, Willard, St. Lawrence, Gowanda and Buffalo State Hospitals were represented, also the Craig Colony for Epileptics, Sonyea, N. Y. The meetings were led by Dr. Meyer and consisted of lectures, demonstrations, and free discussions, concerning clinical cases and matters of psychiatric interest.

Dr. B. Onuf, Pathologist at the Craig Colony for Epileptics, Sonyea, N. Y., gave a résumé of certain pathological work in the laboratory of the Colony during the past year, and also a description of a "Method of Securing Fixation and Hardening of the Central Nervous System before the Autopsy," since published in the *Medical Record,* July 9, 1904.

Dr. R. H. Hutchings, Superintendent of the St. Lawrence State Hospital, presented a study of the recoveries occurring during the past ten years in the St. Lawrence State Hospital, Ogdensburg, N. Y.

Dr. H. P. Frost, First Assistant Physician, Buffalo State Hospital, gave a résumé of a paper on alcoholic psychoses.

The holding of this meeting at a point distant from the Institute in New York City, was somewhat of an innovation, but it proved a success both as to attendance and interest.

An addition to the Nurses' Home for Women was completed in November, 1903, and accommodates thirty-five nurses, making the total capacity of the Nurses' Home seventy. This addition was put up at a reasonable cost, and the Home now houses all the nurses not actually required to room upon the wards as a matter of safety.

A residence for the Medical Superintendent, a residence for the Medical Staff, a chapel and amusement hall, and a home to accommodate 100 male nurses, are now being erected upon the grounds of the hospital.

—*Middletown State Homeopathic Hospital, Middletown.*—During the past year a great deal of repainting has been done both on the exterior and the interior of the institution. Much of the plumbing has been overhauled and a great deal of it has been renewed. Pavilions I and II required the most extensive overhauling. Electric fans have been installed in the infirmary wards and in the kitchen. Considerable work has been done in grading and improving the drainage about the institution.

A room in the basement of the main building has been selected as a museum where specimens of the patients' handiwork are exhibited. It is hoped that in time this collection will have a scientific value and illustrate the effects of the various mental disorders on the patients' creative abilities.

A pathological laboratory has also been fitted up in the basement of the main building.

—*Long Island State Hospital, Kings Park, Long Island.*—In June the annual demonstration of practical nursing by the training class was given.

Arrangements have been made with the Brooklyn and Long Island College Hospitals, whereby all the women graduates of the training class are enabled to take a three months' course. Special opportunities are being given them in the maternity and children's wards.

A contract has been let for new plumbing throughout the cottages, replacing the plumbing which has been in service for many years. This is a much needed improvement, as the old plumbing was wholly inadequate and entirely out of date.

Work on the Nurses' Home is progressing. When completed this building will accommodate 350 employees, and not only add much to their present comfort, but relieve the overcrowding on the wards to a considerable extent.

The installation of the Vacuum system has recently been completed.

A new safe has been placed in the Superintendent's office, for his use as superintendent and treasurer.

—*The Craig Colony for Epileptics, Sonyea.—Constructional Improvements.*—Work is in progress on two small cottages in the Women's Group. Each cottage has a capacity of 17 to 18 patients. These cottages are for the better class.

An addition to the Laundry is also nearing completion. When this addition is finished it is estimated that the capacity of the Colony laundry will be for from 1800 to 2000 persons.

Under a recent law, the Colony is permitted to use the money it earns from the sale of its products, in maintaining and extending its industries. About $3,000 so earned has recently been spent in the Farmstead Group in the way of sheds for cattle, manure pits, and a house 30 x 100 feet, two stories high, for farm tools and implements.

A new oven has been built in the Bakery at a cost of $1400. Its capacity is for 2000 persons.

Two cottages for employees, each costing $1500, are under way and should be finished early in the fall. With the completion of these, the Colony will have fourteen attractive little cottages occupied by the various heads of departments. The aim at Sonyea is to give home life so far as possible to every one.

One of the most needed improvements at the Colony—the construction of roads—is going on. $5,000 is being expended in building a mile of stone road 14 feet wide.

The hospital is having added a new wing, 32 x 74 feet and two stories high. It will contain complete up-to-date facilities for using water in every form in the treatment of disease.

—*Manhattan State Hospital, East, Ward's Island.*—The camp for consumptives continued in operation throughout the year with a capacity of forty-four beds, thus making provision for the out-door treatment of all active cases of pulmonary tuberculosis in the hospital. The scope of the summer camps has been extended and their capacity enlarged, so that in

the current year two hundred and sixty patients have been thus provided for instead of one hundred and seventy-five as in 1903. This number who enjoyed camp life during the summer months only included bed-ridden cases from the hospital wards, aged and decrepit patients, the demented and uncleanly class, as well as a certain number of convalescent patients. The general results obtained with all the different classes of cases treated continued to be of a favorable character as regards both physical and mental improvement.

A modern operating room has been constructed for the gynæcological service in the East Building. The latest model of the Kny-Scheerer sterilizer has been installed and every facility afforded for the proper treatment of such cases as require surgical interference among the women patients.

—*Manhattan State Hospital, West, Ward's Island, New York City.*— Since the issue of the summary for the half year ending March 31, 1904, the clinical work at the hospital was carried on as noted in the last summary in all departments until July 1. Owing to the greatly overcrowded condition of the hospital, the Commission in Lunacy issued instructions that from July 1 to October, commitments through Bellevue Hospital should be sent to Manhattan State Hospital, at Central Islip, L. I. This has given marked relief to the work at this institution and has enabled the medical staff to finish up a large amount of detail clinical work, which had accumulated during the past year, such as reviewing cases, revising summaries, etc.

For the past few weeks gynæcological surgical work under Dr. Le Roy Broun has been suspended. As cooler weather comes on the work will be resumed. The special work mentioned in the previous summary has also been suspended to a considerable extent during the hot weather.

As heretofore Dr. Lusk continues to give attention to general surgery and responds when his services are needed. Dr. Ward A. Holden continues his work as ophthalmologist. Dr. Henry H. Whitehouse, dermatologist, resigned his position on June 21, 1904. The phthisical service has been conducted as previously noted.

The tents were erected early in the spring for the reception of acute cases, and the results in the treatment of cases in this way have been as gratifying as heretofore. Early in the spring a wooden pavilion, to accommodate twenty-five patients, was built and located near the tents. Another to accommodate thirty-five patients is being constructed at the present time. Plumbing, electric lighting and heat are being installed in these frame pavilions so that they can be used in both summer and winter.

The usual entertainments have been provided for the patients. During the summer season out-door dances and concerts were given. Appropriate exercises were held on May-day, and field sports on Decoration day, Independence day and Labor day.

From seventy-five to one hundred and twenty-five patients have been regularly detailed to the lawns and gardens during the summer season.

Excursions on the steamer "Wanderer" have been given weekly on Thursday afternoons to the women patients, and on alternate Saturday afternoons to the men patients.

Through the courtesy of the Manhattan State Hospital, East, our patients have been able to avail themselves of salt water bathing at the ponds established for such purpose.

The following general improvements are completed or are under way:

The interiors of wards 11 and 12 (phthisical wards) have been painted throughout.

Additional fire extinguishers, fire hose and other fire fighting apparatus have been purchased for the better protection of the buildings. Additional radiators have been installed in the men employees' home and also in the women employees' home.

The interior of kitchen No. 2 has been painted.

Five hundred yards of blue stone and screenings have been purchased for the roads.

Arc lights have been installed about the grounds, and are now in use.

Dredging has been done around the coal dock to allow the unloading of larger barges of coal.

The window frames, sashes and other woodwork of the women's home have been painted.

The interior of ward 13 has been painted.

A dishwasher has been purchased and installed in the annex dining room.

A cement walk from dining room No. 3, to the walk leading to dining room No. 8, at the south end of the Island is nearing completion.

A new feed pump has been installed in the power house.

A new stand pipe for fire protection has been installed in the Pathological Institute, which occupies a part of the Verplank Building, and those in wards 18, 19 and 20 have been moved from the center to the north end of the wards. The doors in the Pathological Institute have been fire proofed, and new fire lines have been installed on the steamer "Wanderer," all for better fire protection, and for the same reason all inside doors of various wards and buildings have been changed to open outwardly.

The window guards and fire escapes of the Verplanck Building have been painted, and the window guards of the new building will be completed before October 1.

New transformers have been purchased for the Verplanck Building and are now being installed.

New floors are being laid in ward 13, and a conduit is being built under this ward for the steam pipes.

This hospital has needed a suitable amusement hall, and a hall to accommodate eight hundred people is now being erected. An addition to the Superintendent's cottage is also being erected.

A cement conduit for steam and return pipes is being built from the annex to pavilion ward 34, connecting with the intervening wards, 31, 32 and 33.

Pipe covering has been purchased for all steam and return pipes throughout the institution not already provided.

An additional pump to be used as a fire pump, to be installed in the power house, has been purchased, together with material to provide pump pressure on all water lines to buildings over two stories in height.

Two steam tables have been purchased, one for each of the wooden pavilions erected this summer.

—*Gowanda State Homeopathic Hospital, Gowanda.*—Quite extensive improvements are now under way at this hospital and at present there is being constructed a residence for the superintendent, a house for the staff, a nurses' home with accommodation for one hundred and fifty nurses, and an amusement hall. The contract price for these buildings is one hundred thousand dollars. The removal of the superintendent and staff from the administration building will give additional accommodations for about one hundred more patients.

The staff has been increased by the addition of Dr. Frederick Robbins, of Boston, as interne, and Dr. Stephen Wetmore as clinical assistant.

—*Willard State Hospital, Willard.*—The equipment of the hospital has been increased in various directions during the last half year. The quarantine station has been enlarged and painted; new plumbing has been installed and the building supplied with water and the necessary sewage connections. These improvements have long been greatly needed, and their lack has, in the past, greatly handicapped efforts to deal promptly and thoroughly with patients in quarantine. The quarantine building, which is now nearly ready for use, will accommodate twenty-five persons, if necessary, and its design and equipment make it a model building for its purpose.

The house at Vinelands has been thoroughly overhauled, enlarged, painted and furnished, and connected by a new electric light line with the electric plant. Sewage and water connections have also been made, as well as provision for heating. Much work has been done on the farm surrounding this house, in clearing the land of unnecessary brush, improving the vineyards, pruning the orchards, draining the fields and laying out a road to connect this property with the main portion of the hospital. This building, which is intended to accommodate thirty men patients who are employed in the orchards and vineyards, is now ready for occupancy. It is a very attractive and comfortable, as well as convenient, building for workers of this class.

The new plumbing at Edgemere has been completed.

A new tin-shop has been secured by re-modelling one of the old ice-houses.

The inside painting of buildings occupied by patients has been continued, and we hope to extend this to include all such buildings in the near future.

A number of new instruments has been added to the surgical equipment,

as well as a Kny-Scheerer dressing sterilizer. The facilities for operating are improving steadily, but are still not complete.

The usual number of new books has been added to the Medical Library. The medical work has continued much as formerly. During the early part of the last half-year the regular work along psychiatric lines was greatly impeded by the appearance of epidemics of measles and mumps. Erysipelas occurred with unusual frequency and severity at the same time and these diseases, as well as a few diphtheria cases, made pressing demands on the time of the staff. However, the usual medical work was carried on with unflagging interest. Staff meetings are held almost daily, and all cases admitted are written up and abstracts of them presented at these meetings. There has been a gratifying decrease in the number and frequency of diphtheria cases of late. Six mild cases have been noted since April 1. There were eight cases during the same period of 1903, and thirteen cases from October 1, 1903, to April 1, 1904. No case has occurred since July 1, 1904.

OHIO.—*The Massillon State Hospital, Massillon.*—Four additional cottages have been opened since the beginning of the year, making a total capacity for this institution of 1325.

Two more cottages are completed, and will be occupied within the month, making the capacity of the institution 1460.

The contract has been let for an additional cottage. State care in Ohio will soon become a verity.

We are installing a complete hydrotherapeutic, electrotherapeutic and vibrassage outfit.

There have been no changes in the medical organization of the hospital.

PENNSYLVANIA.—*State Hospital for the Insane, Norristown.*—There is at present under construction in the women's department a home for the women nurses which is about half completed and it is expected that it will be ready for occupation about the first of the year.

—*An Inebriates' Law in Pennsylvania.* At the last meeting of the state legislature of Pennsylvania a law was enacted (P. L., 1903, No. 153), to "legalize the detention of habitual inebriates or drug-takers by commitment of a judge or magistrate to any proper hospital or asylum, for a period of one year unless otherwise discharged."

At the expiration of one year from the enactment of the law, an inquiry was made of various hospitals, and it was ascertained that fifteen persons had been admitted in accordance with this law in five public and private hospitals of the state. At the present date it is doubtful whether any considerable number of the fifteen are remaining in hospitals. In two institutions, concerning which some experience has been had, the magistrates have evidently used the hospitals for temporary commitment of inebriates, as they might commit a person to the reformatory, and sub-

sequently issued orders of discharge—in some cases at the end of thirty days "in order that they might have another chance."

Two writs of *habeas corpus* were issued in the city of Philadelphia. In neither of these instances did the judges offer any opinion as to the constitutionality of the law, but rather evaded the question. In one case the judge discharged the petitioner on his promise of better behavior, and in another case, the judge on hearing the evidence decided that the welfare of the patient required a further detention in the hospital, and he was accordingly remanded there. In another reference to this law it was remarked that the law must be considered to be on trial, and the experience here cited is a contribution in that direction.

—*Joint Meetings of Commission and Hospital Officers.* During September, 1903, a society was formed, composed of the members of the Lunacy Commission, trustees and mangers of hospitals for the insane, and the physician-superintendents. A meeting for organization was held at Danville State Hospital. The object of this association is the elevation of the standard of care in hospitals for the insane and their betterment, and the discussion of such professional and administrative questions as may come before the several meetings. It is the purpose to hold meetings semi-annually at the different hospitals in rotation.

TENNESSEE.—*Lyons View Hospital, Knoxville.*—An extension to the west wing of this hospital is now being erected and it is expected that it will be completed in May or June of the ensuing year. The appropriation for this work was thirty-three thousand dollars.

VIRGINIA.—*Central State Hospital, Petersburg.*—A cottage with basement and two stories, with capacity for seventy-two acute female cases, is being erected. Part of the basement of this building will be used for a dining room, special kitchen, etc., and part for a bathroom which will later on be properly equipped with modern appliances.

An attendant's home, a cottage two stories high with capacity for about seventy, is in course of construction.

Ground has been broken for a recreation hall and chapel, and for an industrial building or shop in which various kinds of indoor work by the patients will be carried on.

All these buildings are constructed of red brick and trimmed with grey granite and grey brick; the roofs will be covered with slate and the floors generally with Georgia riff-pine.

Last winter an adjacent farm of nearly one hundred acres (making the entire acreage 500) was purchased and a farm-house thereon renovated and converted into quarters for several male patients of a quiet type. A canvas tent has been added to this colony and the number of patients increased to twenty-eight. Here the population is constantly changing in order to provide a two weeks' outing for as many patients as possible.

Since the spring, canvas tents for tuberculous patients have been in use. There is a camp for male and one for female patients—in all about sixty. These tents are pitched on the slopes south of the respective male and female hospital groups.

The number of patients in the hospital has been more than eleven hundred. All the colored insane, however, of the state are cared for here. None of these unfortunates are housed in jails or poor-houses.

Three internes, representing the three medical schools of the state, have been appointed on the medical staff.

WISCONSIN.—*Milwaukee Hospital for Insane, Wauwatosa.*—During the past summer a combination curb and gutter has been laid along the new driveway from the main entrance to the front door, including the circle in front of the administration building. This drive, which is shaded on both sides by trees, will be composed of crushed stone and rolled thoroughly. A cement walk skirting this drive is being laid at present, and both together will constitute a very substantial improvement. This work was done by an employee assisted by patients and at a very low cost.

The lake and its surroundings have been greatly beautified, notably, by the erection of a rockery and waterfall on the island in the lake and by the addition of bridges of rustic design over the brook which forms the outlet of the lake.

The pavilion in the women's grove which was used for dancing as well as a shelter, was destroyed by fire in the month of July and has since been rebuilt on a larger scale. The dimensions of the present structure are 65 feet by 25 feet. A concrete floor will be laid and the pavilion will be used as a roller skating-rink as well as for dancing.

The new ice plant of twelve-ton refrigerating capacity and two-ton ice making capacity is in operation and has proven of great utility. The cold storage building is practically completed and will be put in use within a week. A 75 kilowatt generator will be installed the latter part of the present month.

WEST VIRGINIA.—*The West Virginia Asylum, Huntington.*—There have been no changes in the hospital buildings. The staff has been increased by the appointment of Dr. T. W. Moore, as consulting oculist and aurist.

IOWA.—*Clarinda State Hospital, Clarinda.*—During the last biennial session of the legislature an appropriation was made for the erection of a fireproof cottage to give accommodation for one hundred men; also for a large brick shop building wherein could be gathered together all of the various industries of the institution. An additional appropriation was made for a coal house wherein a large supply of coal could be stored. These various improvements are well under way in construction and the cottage promises not only to be handsome in appearance, but very comfortable. It will accommodate one hundred male patients whose condition is of such

a character as to profit by enlarged liberties, and who will be employed about the farm, gardens, and shops. The construction of the shop building is also well under way and its completion will be a great convenience and relief, as many of the rooms now occupied as shops are urgently needed for the accommodation of employees.

Some two years ago over 300 acres of most fertile and well located valley land was purchased for the state. Two small farm buildings have been moved together and have been entirely remodeled with the result that this institution will have a fine farm cottage which will give a home to some twenty trusty patients under the management and direction of an assistant farmer and his wife. This cottage is now nearly ready for occupancy. The colony is located a little over three-fourths of a mile from the main building of the hospital and no doubt will prove a source of much pleasure and benefit to its occupants.

Appointments, Resignations, Etc.

ATKINSON, DR. EDWARD, formerly Assistant Physician at the Retreat for the Insane, Hartford, Conn., has resigned to enter into private practice at Niantic, Conn.

BASCH, DR. SAMUEL H., resigned as Medical Interne at the Manhattan State Hospital, West, Ward's Island, New York.

BREWSTER, DR. GEORGE E., formerly Junior Assistant Physician, promoted to be Assistant Physician at the Middletown State Homeopathic Hospital at Middletown, N. Y.

BRUNK, DR. OLIVER CURRY, formerly Fourth Assistant Physician and Pathologist at the Central State Hospital at Petersburg, Virginia, promoted to be First Assistant Physician.

CULLEN, DR. WILLIAM H., formerly Junior Physician at the Manhattan State Hospital, West, at Ward's Island, New York, appointed to the Syracuse State Institution for Feeble-Minded Children.

DEWING, DR. O. M., transferred as Superintendent from the Long Island State Hospital at Kings Park, N. Y., to the Long Island State Hospital at Flatbush, N. Y.

DINNICK, DR. OSWALD, resigned as Clinical Assistant at the Manhattan State Hospital, West, Ward's Island, New York.

DOUGLAS, DR. SUMNER E., appointed Medical Interne at the Manhattan State Hospital, West, Ward's Island, N. Y.

ELLIOTT, DR. ROBERT M., transferred as Medical Superintendent from the Long Island State Hospital at Flatbush, N. Y., to the Willard State Hospital at Willard, N. Y.

EVERETT, DR. EDWARD A., formerly Second Assistant Physician, promoted to be First Assistant Physician at the Middletown State Hospital at Middletown, N. Y.

EWING, D. HALLIE L., formerly Assistant Physician at the Department for Women at the State Hospital for the Insane at Norristown, Pa., resigned to enter into private practice at Seattle, Washington.

HARRIS, DR. HARRY G., appointed Clinical Assistant at the Manhattan State Hospital, West, Ward's Island, N. Y.

HENRY, DR. HUGH CARTER, resigned as First Assistant Physician at the Central State Hospital, Petersburg, Virginia, to enter into private practice.

HUMPHREYS, DR. L. W., appointed Assistant Physician at the West Virginia Asylum at Huntington, W. Va.

JOHNSON, DR. HARRY OTIS, formerly Assistant Physician at the Eastern Hospital for the Insane at Bangor, Maine, appointed Assistant Physician at the Retreat for the Insane at Hartford, Conn.

LIGHT, DR. S. RUDOLPH, appointed Assistant Physician to the Michigan Asylum for the Insane at Kalamazoo, Mich.

LOCKE, DR. CHARLES F. A., resigned as Clinical Assistant at the Manhattan State Hospital, West, Ward's Island, New York.

LO GRASSO, DR. HORACE, appointed Medical Interne at the Craig Colony, Sonyea, N. Y., with special duties in the pathological laboratory.

LOUTFIAN, DR. JOHN L., formerly Junior Assistant at the Willard State Hospital at Willard, N. Y., resigned to enter private practice.

LYON, DR. CHARLES G., formerly Medical Interne at the Willard State Hospital, Willard, N. Y., appointed Junior Assistant Physician at the Binghamton State Hospital, Binghamton, N. Y.

MACDONALD, DR. A. E., Superintendent of the Manhattan State Hospital, East, resigned.

MACY, DR. WILLIAM AUSTIN, transferred as Superintendent from the Willard State Hospital to the Long Island State Hospital at Kings Park, Long Island, N. Y.

MAGNESS, DR. F. H., Assistant Physician at the Manhattan State Hospital, Central Islip, New York, transferred to the Manhattan State Hospital, East, Ward's Island, New York.

MEAGHER, DR. JOHN F. W., resigned as Junior Physician at the Manhattan State Hospital, West, Ward's Island, New York.

MITCHELL, DR. ROY E., formerly Medical Interne, promoted to be Junior Physician at the Middletown State Homeopathic Hospital at Middletown, N. Y.

NAIEN, DR. B. ROSS, formerly Junior Physician at the Hudson River State Hospital, transferred to be Junior Physician at the Buffalo State Hospital, Buffalo, N. Y.

PARKINSON, DR. J. M., appointed Junior Physician at the Manhattan State Hospital, East, Ward's Island, New York.

PHILLIPS, DR. A. M., appointed Junior Physician at the Manhattan State Hospital, East, Ward's Island, New York.

RADEMAKER, DR. ROBERT C. H., resigned as Clinical Assistant at the Manhattan State Hospital, West, Ward's Island, New York.

RANDOLPH, DR. JAMES H., appointed Clinical Assistant at the Sheppard and Enoch Pratt Hospital, Towson, Md.

REED, DR. RALPH, formerly Clinical Assistant at the Middletown State Homeopathic Hospital at Middletown, N. Y., resigned to accept a position in a private institution for the insane.

RICHARDS, DR. GEORGE G., appointed Assistant Physician to the Michigan Asylum for the Insane at Kalamazoo, Mich.

ROBBINS, DR. FREDERICK, appointed Medical Interne at the Gowanda State Homeopathic Hospital, Gowanda, N. Y.

SANFORD, DR. WALTER H., formerly Junior Physician at the Long Island State Hospital at Kings Park, N. Y., promoted to be Assistant Physician.

SHAW, DR. WILLIAM F., appointed Medical Interne at the Manhattan State Hospital, West, Ward's Island, N. Y.

SPENCER, DR. ELIZABETH C., appointed Assistant Physician in the Department for Women at the State Hospital for the Insane at Norristown, Pa.

STERN, DR. ADOLPH, promoted from Medical Interne to be Junior Physician at the Long Island State Hospital at Kings Park, N. Y.

TALBOT, DR. ROBERT SLAUGHTER, Third Assistant Physician at the Central State Hospital at Petersburg, Virginia, has been granted leave to take a post-graduate course in New York.

TREMAINE, DR. A. M., formerly Women's Physician at the Craig Colony at Sonyea, N. Y., has resigned and gone abroad for two years' study.

WASHBURN, DR. JOHN L., appointed Junior Physician at the Manhattan State Hospital, West, Ward's Island, N. Y.

WETMORE, DR. STEPHEN, appointed Clinical Assistant at the Gowanda State Homeopathic Hospital at Gowanda, N. Y.

WHITNEY, DR. LEE A., formerly Medical Interne at the Buffalo State Hospital, Buffalo, N. Y., transferred to be Resident House Surgeon at the New York State Hospital for the Care of Crippled and Deformed Children at Tarrytown, N. Y.

WILLIAMS, DR. BRYAN G., formerly Assistant Physician at the Long Island State Hospital at Kings Park, N. Y., died May 13, 1904.

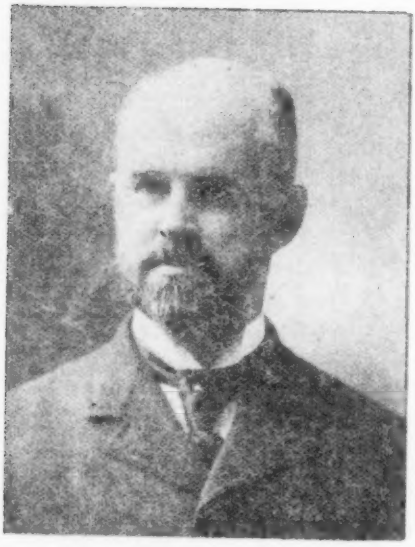
WILLIAMSON, DR. A. P., recently in private practice in Minneapolis, appointed Medical Superintendent of the Southern California Hospital for the Insane at Patton, near Redlands, California.

WILSON, DR. W. H., formerly Assistant Physician at the West Virginia Asylum at Huntington, W. Va., resigned.

WOODMAN, DR. ROBERT C., formerly Second Assistant Physician, promoted to be First Assistant Physician at the Middletown State Homeopathic Hospital at Middletown, N. Y.

WOOLLEY, DR. HERBERT C., appointed Clinical Assistant at the Manhattan State Hospital, West, Ward's Island, N. Y.

WASHBURN, DR. P. C., appointed Junior Physician at the Manhattan State Hospital, East, Ward's Island, New York.



DR. H. E. ALLISON